# Appendix 3-2: Annual Permit Report for the Non-Everglades Construction Project

**Permit Report (May 1, 2013–April 30, 2014)**
**Permit Number: 0237803**
**(Original Permit Number: 06, 502590709)**

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## SUMMARY

Based on Florida Department of Environmental Protection (FDEP) permit reporting guidelines, **Table 1** lists key permit-related information associated with this report. **Table 2** lists the attachments included with this report. **Table A-1** in Attachment A lists specific pages, tables, graphs, and attachments where project status and annual reporting requirements are addressed. This annual report satisfies the reporting requirements specified in the permit.

**Table 1.** Key permit-related information.

| | |
|---|---|
| **Project Name:** | Non-Everglades Construction Project |
| **Permit Number:** | 0237803 (Original Permit: 06,502590709) |
| **Other Related Permit:** | 0306639-001 (S-197 Structure Replacement) |
| **Issue and Expiration Dates:**<br>Permit 06,502590709 (Original):<br>Permit 0237803 (Reissue): | <br>Issued: 4/20/1998; Expired: 4/20/2003<br>Issued: 4/21/2003; Expires: Administratively extended in 2008 until the Long-Term Compliance Permit required by the Everglades Forever Act is issued. |
| Permit 0306639-001 (S-197 Structure Replacement): | Issued: 8/9/2011; Expires: 8/9/2016 |
| **Project Phase:** | Operation |
| **Permit Specific Condition Requiring Annual Report:** | 5 (Non-ECP Permit), and<br>25 (S-197 Structure Replacement Permit) |
| **Reporting Period:** | May 1, 2013–April 30, 2014 |
| **Report Lead:** | Shi Kui Xue: sxue@sfwmd.gov, 561-682-2333 |
| **Permit Coordinator:** | Leslye Waugh: lwaugh@sfwmd.gov, 561-682-6483 |

**Table 2.** Attachments included with this report.

| Attachment | Title |
|---|---|
| A | Specific Conditions and Cross-References |
| B | Water Quality Data |
| C | Hydrologic Data |
| D | Non-Everglades Construction Project/S-197 Structure Replacement Project Water Quality Sampling Sites, Monitoring Schedule, and Flow Volumes |
| E | Summary Statistics of Non-Everglades Construction Project Water Quality Monitoring Data for Water Year 2014 |
| F | Time-Series and Trend Plots of Total Phosphorus at Non-Everglades Construction Project Monitoring Sites for Water Year 2014 and Earlier Periods |
| G | Non-ECP Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area |
| H | Statements of Authenticity for Analytical and Sampling Programs |

## PROJECT STATUS

During Water Year 2014 (WY2014) (May 1, 2013–April 30, 2014), Non-ECP structures, including S-197, were in normal operations and monitoring activities were conducted as required by the permit.

Maintenance activity approval for refurbishment of the G-94 structures was obtained from FDEP on April 23, 2013. The G-94 Refurbishment Project began in November 2013, and is expected to be completed in early 2015. The G-94 A, C, and D structures will be replaced in kind, and the G-94B structure will be removed completely along the L-40 Levee in Palm Beach County. Maintenance activities did not interfere with normal operations of the Non-ECP structures.

For dissolved oxygen (DO), monitoring data indicated that there were 23 sites that did not meet the new Florida Class III freshwater criterion (**Table 5**). However, there were no excursions of the Site Specific Alternative Criteria (SSAC) for DO for the downstream marsh stations; therefore, there is no concern for DO for Non-ECP structures. All other water quality parameters met Class III surface water quality criteria.

Based on total phosphorus (TP) data collected for the monitoring sites, the Feeder Canal Basin was found to be a site of "concern" for TP, and the L-28 Basin and C-11 West Basin were found to be of "potential concern" for TP. The C-111 Basin had the lowest TP concentrations during the reporting period and was not a concern for TP.

None of the other toxicants detected at the monitoring sites were at levels of "concern". Dichlorodiphenyldichloroethylene (DDE) was detected at two locations (S-9 and S-178) at a level of "potential concern". PCB-1242 detected at G-123, PCB-1254 at S-140, and PCB-1260 at S-9, were at levels of "potential concern".

Total annual mercury (Hg) wet deposition for the EPA in calendar year (CY) 2013 was slightly higher than during CY2012. During WY2014, the average basinwide Hg concentration in mosquitofish decreased, while the average basinwide concentrations in sunfish and largemouth bass increased compared with WY2013.

Detailed discussion of the water quality levels of concern and monitoring results are included in the *Water Quality Evaluation* section. Mercury results are discussed in Attachment G.

## CONCLUSIONS REGARDING PROJECT SUCCESS

All water quality parameters met the Class III surface water quality criteria except for DO, and there was no concern for DO for the Non-ECP structures. The FWM TP concentrations of all structures discharged to Everglades Protection Area showed a downward trend. S-197 discharged 6,814 acre-feet (ac-ft) of water from July 18 to July 22, 2013, successfully achieving its flood control objectives. Based on these observed water quality conditions, the project operated successfully in WY2014.

## PROBLEMS ENCOUNTERED

No problems were encountered.

## ACTIONS TO ADDRESS PROBLEMS

None were needed.

# INTRODUCTION

## PROJECT OVERVIEW

The Non-ECP permit (FDEP permit 0237803) authorizes the South Florida Water Management District (SFWMD or District) to operate and maintain 37 structures, and specifies reporting requirements in Specific Conditions 5 and 12. The S-197 Structure Replacement Project permit (0306639-001) was issued under the authority of Part IV of Chapter 373, Florida Statutes (F.S.), and Title 62, Florida Administrative Code (F.A.C.) and specifies a reporting requirement in Specific Condition 25.

S-197 construction impacted 0.06 acres of mangroves within the project area. Adverse impacts were offset by planting approximately 160 red mangroves (*Rhizophora mangle*) within 0.11 acres along the east canal bank of the C-111, downstream of the S-197 structure, in November 2012. Mitigation monitoring reports are submitted separately to FDEP.

## PERMIT HISTORY

The original permits and modifications issued to the SFWMD for the Non-ECP and S-197 Structure Replacement Project include:

### Non-ECP (Permits 06,502590709 and 0237803)

- 06,502590709, issued April 20, 1998, with an expiration date of April 20, 2003, is the original permit which authorized the District to operate and maintain the project.
- 06,502590709, issued February 25, 2003, renewed the original permit, authorizing the District to continue to operate and maintain the project.
- 0237803-001, issued December 23, 2003*, replaced the original permit and extended the project.
- 0237803-002, issued January 21, 2005, authorized decommissioning of the S-10E structure and ended water quality monitoring associated with the structure.

- 0237803-003, issued May 18, 2005, reduced the number of parameters for water quality monitoring. Removed structure S-14 from the permit, and removed structures S-175 and S-332 from the list of "into" structures.
- 0237803-004, issued June 2, 2005, removed the monthly monitoring requirement for physical parameters and nutrients at structures G-64 and S-197.
- 0237803-005, issued July 13, 2006, designated S-332 and S-175 as "within" structures; incorporated Berm B3 into the permit as a "within" structure; removed the G-71 culvert from the permit; corrected two typographical errors in the Basin Monitoring Schedule Table related to the monitoring frequency for the G-64 and S-197 structures.
- 0237803-006, issued May 3, 2007, removed structure G-69 from the permit; withdrawn on December 10, 2009.
- 0237803-007, issued May 3, 2007, authorized removal of S-174 from the "into" structures and incorporated G-94D as a "from" structure.
- 0237803-008, issued August 28, 2007, added a requirement to monitor water quality according to the integrated monitoring design for the northern boundary of the Park and eastern boundary of the Park.
- 0237803-009, issued February 21, 2008, reduced the sampling frequency at structures G-94D and Acme IDS in the Acme Improvement District.
- 0237803-010, issued April 18, 2008, removed monitoring requirements for S-174; removed references to the S-38B structure, since it is part of the North Springs Improvement District and is not owned or operated by the District; removed monitoring requirement for pesticides in sediment and water at G-94D and ACME 1DS; replaced the existing mercury plan with the revised mercury monitoring plan, and changed G-94D from an "into" structures to a "from" structure.
- 0237803-011, issued March 31, 2010, granted an exemption from the geotechnical investigation requirement (Part IV of Chapter 373 Florida Statutes, pursuant to Subsection 373.406(6), F.S.) for the full replacement of the S-197 structure.

**Note: The Non-ECP permit (original and modifications) was administratively extended in 2008 until the Long-Term Compliance Permit required by the Everglades Forever Act (EFA) is issued.*

### S-197 (Permit 0306639)

- 0306639-001, issued August 9, 2011, with an expiration date of August 9, 2016, authorized construction of the S-197 structure replacement.

# METHODS

## WATER QUALITY AND HYDROLOGIC DATA

The water quality and hydrologic data evaluated in this report were retrieved from the District's DBHYDRO database. Before water quality data are entered into the database, the District follows strict quality assurance/quality control (QA/QC) procedures outlined in the District's Chemistry Laboratory Quality Manual (SFWMD, 2012) and Field Sampling Quality Manual (SFWMD, 2011). The laboratory manual was developed in accordance with National Environmental Laboratory Accreditation Conference requirements, and both the laboratory and

the field manuals in accordance with the FDEP Quality Assurance Rule (Chapter 62-160, F.A.C.). These quality manuals describe procedures that the water quality monitoring program follows to obtain accurate data to assess progress being made toward achieving water quality standards.

The standards used to evaluate the accuracy of the rating for flow calculations are consistent with the SFWMD's standard operating procedures for flow data management in the District's hydrologic database (Akpoji et al., 2003) and the U.S. Geological Survey's approach as outlined by Novak (1985). Four accuracy classifications were adopted to assess a rating's accuracy. A rating is classified as (1) "excellent" when about 95 percent of the predicted flow rates are within ±5 percent of the measured discharges, (2) "good" if they are within ±10 percent, (3) "fair" if they are within ±15, and (4) "poor" when they are not within ±15 percent.

## SAMPLING SITES

In addition to authorizing operation and maintenance of the Non-ECP structures, the Non-ECP permit requires a routine water quality monitoring program to characterize the quality of water discharged through District structures. Currently, the Non-ECP permit requires monitoring at four additional C-111 Basin structures (upstream) that are controlled by the District.

The District typically collects water quality samples on the upstream side of a structure or at a nearby location representative of the quality of water flowing through a structure. Structure locations are shown in **Figure 1**. Structure names, representative water quality monitoring location names, sampling frequencies required by the permit, and monthly and annual flow volumes are shown in Attachment D, Table D-3.

After construction of the S-197 replacement structure was completed in December 2012, water quality monitoring at surrogate site S-18C ended, and sampling resumed directly at the S-197 structure.

## DATA ANALYSIS PERIODS

Specific Condition 12 requires the District to submit annual monitoring reports providing updates on water quality data and associated comparisons with state water quality standards. The water quality characterization evaluates compliance with Class III criteria for each monitoring location representative of a Non-ECP structure. This report provides the annual update of the Non-ECP permit monitoring program (Specific Condition 12) and a comparison of water quality data at the project's structures to state water quality standards from WY2014. This fulfills the permit requirement to measure progress toward achieving and maintaining compliance with state water quality standards.

### Method Detection Limits

Each water quality constituent has a method detection limit (MDL) that essentially defines the minimum concentration or level at which the presence of the constituent can be positively verified. It is usually twice the background noise level associated with a test. The MDL does not represent a level at which an exact measurement can be determined. The practical quantitation limit (PQL) represents the lowest level at which a measurement can be considered quantifiably reliable for a constituent that is achievable (among laboratories within specified limits during routine laboratory operations). Generally, the PQL is four times the MDL, although different laboratories may establish PQLs at two to five times the MDL. In this report, trace metal data that were reported to be less than the MDL were assigned a value equal to the MDL. TP data that were less than the MDL of 2.0 µg/L (or ppb) were assigned a value of 2.0 ppb to provide a

conservative basis for statistical analysis. For pesticide detections, concentrations greater than the PQL were considered reliable.

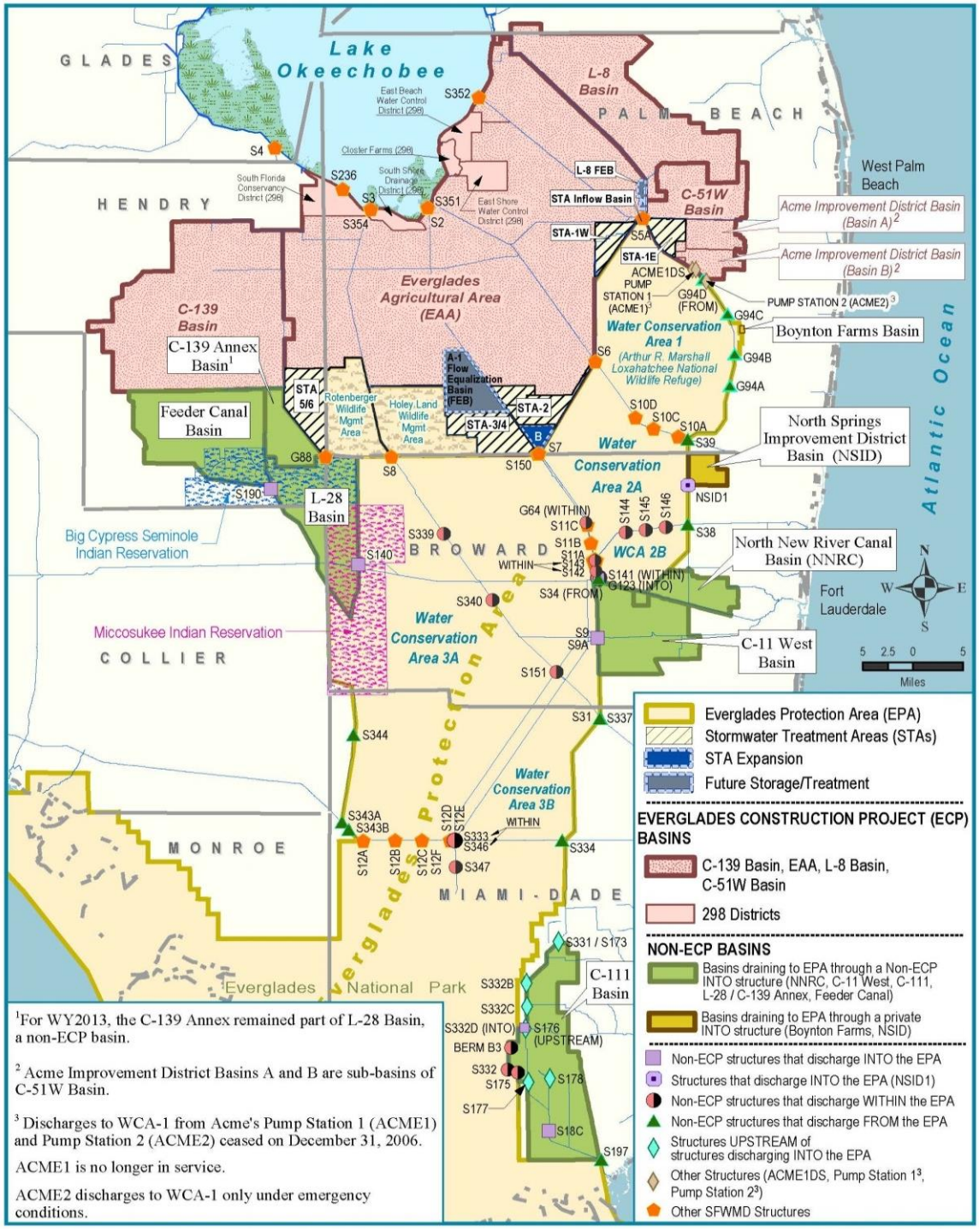



**Figure 1.** Non-ECP discharge structures and additional upstream structures.

# EXCURSION ANALYSIS FOR CLASS III CONSTITUENTS AND PESTICIDES

To evaluate compliance with water quality criteria in WY2014, constituent concentrations and detected pesticides were compared to their respective Class III numeric criteria. If a constituent concentration exceeded its numeric criterion, then an excursion was noted and the total number and percent of excursions for the Non-ECP structures were tabulated in Attachment E, Table E-3.

## Total Phosphorus

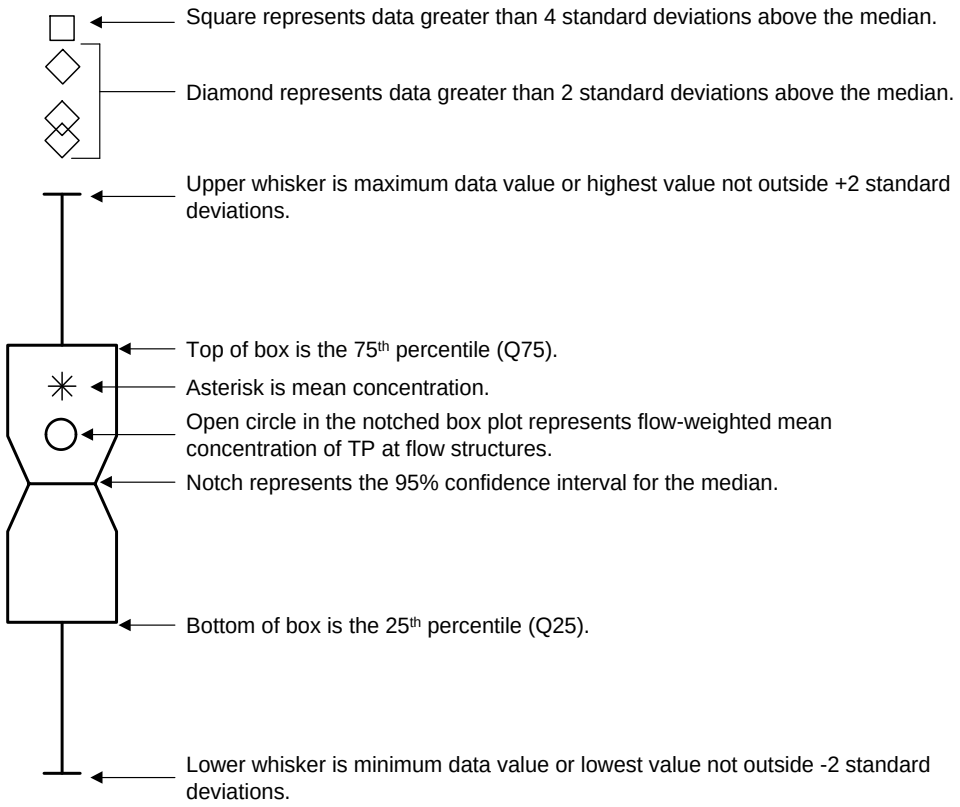
TP data are presented in this report as time series plots and statistical box plots. For TP, any site with data greater than 50 ppb is viewed as a concern, any site with data greater than 10 ppb is viewed as a potential concern, and any site with data less than 10 ppb is viewed as no concern. This approach is consistent with the federal Everglades Settlement Agreement (i.e., Settlement Agreement dated July 26, 1991, entered in Case No. 88-1886-Civ-Hoeveler, U.S. District Court for the Southern District of Florida, as modified by the Omnibus Order entered in the case on April 27, 2001). The Everglades Forever Act, Section 373.4592, Florida Statutes (F.S.)., authorized construction, operation, and maintenance activities for stormwater treatment areas to deliver a uniform, long-term, annual FWM TP concentration of 13 ppb or less Water Quality Based Effluent Limit (WQBEL) at each inflow point to the EPA. Additionally, the Everglades Forever Act (EFA) mandates that the default TP criterion shall be 10 ppb in the EPA, in the event that the FDEP did not adopt by rule such a criterion by December 31, 2003. Because final agency action by the FDEP did not occur prior to December 31, 2003, as a result of unresolved legal challenges, a default TP criterion of 10 ppb became effective, as specified by the EFA. There are additional TP concentration compliance limits for inflows to the Everglades National Park (ENP) by way of Shark River Slough (S-12s and S-333) and the coastal basin (S-18C), outlined in Appendix A of the Settlement Agreement. However, this annual report does not track compliance with the long-term TP concentration limits set forth in the Settlement Agreement.

The District's categories of concern, potential concern, and no concern are based on a common sense understanding of water resources protection. These terms, however, are not intended to be interpretations of state water quality standards or state water quality law. The FDEP, not the District, is responsible for interpreting whether a given constituent violates the numeric criterion, the narrative criterion, a water body's designated uses, or the anti-degradation policy.

# DESCRIPTION OF NOTCHED BOX-AND-WHISKER PLOTS

Notched box-and-whisker plots were created to summarize data for each constituent that exceeded its numeric criteria. These plots also summarize TP data collected at all monitoring locations. A notched box-and-whisker plot summarizes selected statistical properties of a data set. Notched box-and-whisker plots can be used to test for statistical significance between data sets at roughly a 95 percent confidence interval to detect changes in constituent concentration variability over time and to determine if trends exist. The notched box-and-whisker plots used for these summaries are based on McGill, et al. (1978) (**Figure 2**).

The object of providing the plots is to compare TP data of the Non-ECP discharge structures in WY2014.




1. Notches surrounding the medians provide a measure of the significance of differences between notched-box plots. If the notches surrounding two medians do not overlap, then the medians are significantly different at about a 95 percent confidence level.
2. At times, the variability in a data set may be quite high. When highly variable data are presented in a notched box-and-whisker plot, the width of the notch may be greater than the 25th or 75th percentile. When this occurs, the box plot appears as if it is folded from the end of the notch back towards the median. This is done automatically by the statistics program to save space within the figure being presented.
3. Notches are calculated using the following equation:

$$Notch = Median \pm \frac{1.58(Q75 - Q25)}{\sqrt{n}}$$

Where n = number of data points shown on the bottom of **Figures 3a-3d**

**Figure 2.** Description of notched box-and-whisker plots used in this report.

# WATER QUALITY EVALUATION

In accordance with Specific Conditions 5 and 12(h) of the Non-ECP permit and Specific Condition 25 of the S-197 Structure Replacement Permit, this section presents results of water quality and physical parameters measured during WY2014. For standards with numeric criteria, data from the structures were assessed for compliance with those standards using the procedures in Rule 62-4.246, F.A.C. For parameters that have narrative water quality criteria, the concentrations obtained at each structure were reported using plots and summary statistics. Water quality monitoring data, including mercury and other toxicants, are provided in Attachment B.

## PHYSICAL PARAMETERS, NUTRIENTS, AND MAJOR IONS

### Descriptive Statistics

A summary of the data begins with a presentation of descriptive statistics for all water quality constituent concentrations and physical properties (excluding pesticides and priority pollutants) measured for Non-ECP monitoring locations during WY2014 (Attachment E, Table E-3). The descriptive statistics (summary tables) are presented by monitoring location for each water quality parameter collected for the site. Relevant state Class III criteria are shown in **Table 3**.

The statistical summary tables report the range of constituent concentrations, median values, the number of sample observations, selected data percentiles ($25^{th}$ and $75^{th}$), and flag parameters exhibiting excursions from Class III numeric criteria. Concentrations observed to be less than the lower limit of the analytical method (MDL) were set equal to the MDL for statistical analysis.

For parameters such as nutrients that have only narrative criteria, the tables provide basic information to assist with identifying water quality constituents that might be of concern. TP is the nutrient deemed to be of particular concern for Non-ECP structures.

### Excursions from Class III Criteria (Numeric)

Further analysis of excursions from Class III criteria was accomplished by summarizing the excursions, plotting the data for parameters exhibiting the excursions, discussing the parameters, and noting which ones are a concern. The excursion analysis is based on water quality parameters with numeric criteria collected for the Non-ECP monitoring program, and can be compared with applicable Class III water quality criteria listed in Rule 62-302.530, F.A.C. and included **Table 3**.

DO exhibited excursions during WY2014. Attachment E, **Table E-1** summarizes previously reported information and compares those annual results to WY2014. **Table E-4** provides a dissolved oxygen compliance summary for Non-ECP Project for WY2014. A summary of observed excursions from Class III criteria for individual Non-ECP monitoring locations during WY2014 is presented in **Table 4**. The monitoring locations are categorized in the table as "into," "within," "from," or C-111 Basin locations, as defined by the Non-ECP permit.

**Table 3.** Florida Class III surface water criteria.
Water quality data are summarized in Attachment E, **Table E-3**.

| Parameter | Abbreviation | Unit | Class III Criteria Predominantly Fresh Surface Waters Section 62-302.530, F.A.C. |
|---|---|---|---|
| **PHYSICAL** | | | |
| Dissolved Oxygen | DO | mg/L | No more than 10% of daily average DO saturation < 38% |
| Specific Conductance (Field) | FLDCOND | µmhos/cm | Not greater than 50% above background or 1,275 µmhos/cm, whichever is greater |
| pH (Field) | PH | Units | Not less than 6.0 or greater than 8.5 |
| Turbidity | TURBIDITY | Ntu | Less than or equal to 29 NTU above natural background |
| Total Suspended Solids | TSS | mg/L | None |
| Hardness | HARDNESS | mg/L as $CaCO_3$ | None |
| Temperature | TEMP | Centigrade | None |
| Alkalinity | ALKALINITY | mg/L | Not less than 20 mg/L |
| **NUTRIENTS** | | | |
| Total Nitrogen | TN | mg N/L | narrative criteria |
| Nitrite + Nitrate | NOX | mg N/L | narrative criteria |
| Ammonium | NH4 | mg N/L | narrative criteria |
| Un-Ionized Ammonia | UN-IONIZED AMMONIA | mg/L as $NH_3$ | Less than or equal to 0.02 mg/L |
| Inorganic Nitrogen | NNH4 | mg N/L | narrative criteria |
| Organic Nitrogen | ORGN | mg N/L | narrative criteria |
| Total Kjeldahl Nitrogen | TKN | mg N/L | narrative criteria |
| Ortho-Phosphorus | OPO4 | mg P/L | narrative criteria |
| Total Phosphorus | TP | mg P/L | narrative criteria |
| **MAJOR IONS** | | | |
| Dissolved Calcium | DIS. CA | mg/L | None |
| Dissolved Potassium | DIS. K | mg/L | None |
| Dissolved Magnesium | DIS. MG | mg/L | None |
| Dissolved Sodium | DIS. NA | mg/L | None |
| Dissolved Silica | DIS. SILICA | mg/L | None |
| Total Sulfate | TOT. SO4 | mg/L | None |
| Total Chlorides | TOT. CL | mg/L | None |
| **TRACE ELEMENTS** | | | |
| Total Mercury | TOT. HG | µg/L | Less than or equal to 0.012 µg/L |
| Total Iron | TOT. FE | mg/L | Less than or equal to 1.0 mg/L |

**Table 4.** Summary of excursions from Florida Class III surface water criteria for individual Non-ECP monitoring sites and additional upstream monitoring locations during WY2014.

| Area | Structure | Sampling Site | Alkalinity | DO Excursion Rate <10% | Specific Conductance | pH | Turbidity | Un-Ionized Ammonia | Iron |
|---|---|---|---|---|---|---|---|---|---|
| Into | G-123 | G123 | -ND- | **No** | (0 : 12) | (0 : 12) | (0 : 14) | -ND- | -ND- |
| | S-9 | S9 | -ND- | **No** | (0 : 52) | (0 : 52) | (0 : 17) | -ND- | -ND- |
| | S-9A | S9A | -ND- | **No** | (0 : 52) | (0 : 52) | (0 : 18) | -ND- | -ND- |
| | S-18C | S18C | -ND- | **No** | (0 : 52) | (0 : 52) | (0 : 7) | -ND- | -ND- |
| | S-332D | S332DX | -ND- | **No** | (0 : 52) | (0 : 51) | (0 : 6) | -ND- | -ND- |
| | S-140 | S140 | -ND- | **No** | (0 : 52) | (0 : 52) | (0 : 23) | -ND- | -ND- |
| | S-190 | S190 | -ND- | **No** | (0 : 51) | (0 : 50) | (0 : 22) | -ND- | -ND- |
| Within | G-64 | G64 | No data (Structure Closed) | | | | | | |
| | S-346, S-347 | S12D | -ND- | **No** | (0 : 40) | (0 : 40) | -ND- | -ND- | -ND- |
| | S-141 | S34 | S34 used as a surrogate for this station) | | | | | | |
| | S-142 | S142 | -ND- | Yes | (0 : 12) | (0 : 12) | (0 : 12) | -ND- | -ND- |
| | S-143 | S11A | (0 : 19) | Yes | (0 : 21) | (0 : 21) | (0 : 21) | (0 : 19) | (0 : 4) |
| | S-144, S-145, S-146 | S145 | (0 : 21) | Yes | (0 : 22) | (0 : 22) | (0 : 22) | (0 : 21) | (0 : 4) |
| | S-151 | S151 | -ND- | **No** | (0 : 33) | (0 : 33) | (0 : 18) | -ND- | -ND- |
| | S-333 | S333 | -ND- | **No** | (0 : 50) | (0 : 51) | (0 : 3) | -ND- | -ND- |
| | S-339, S-340 | C123SR84 | -ND- | **No** | (0 : 17) | (0 : 17) | (0 : 17) | -ND- | -ND- |
| | S-175 | S175 | -ND- | **No** | (0 : 1) | (0 : 1) | -ND- | -ND- | -ND- |
| | S-332 | S332 | -ND- | -ND- | -ND- | -ND- | -ND- | -ND- | -ND- |
| | BERMB3 | BERMB3 | -ND- | **No** | (0 : 10) | (0 : 10) | (0 : 2) | -ND- | -ND- |
| From | G-94A, G-94B, G-94C | G94B | -ND- | **No** | (0 : 14) | (0 : 14) | (0 : 14) | -ND- | -ND- |
| | G-94D | G94D | -ND- | -ND- | -ND- | -ND- | -ND- | -ND- | -ND- |
| | S-31, S-337 | S31 | -ND- | **No** | (0 : 18) | (0 : 18) | (0 : 20) | -ND- | -ND- |
| | S-34 | S34 | -ND- | Yes | (0 : 20) | (0 : 20) | (0 : 20) | -ND- | -ND- |
| | S-38 | S38 | (0 : 26) | **No** | (0 : 26) | (0 : 26) | (0 : 26) | (0 : 26) | (0 : 4) |
| | S-39 | S39 | (0 : 23) | **No** | (0 : 24) | (0 : 24) | (0 : 24) | (0 : 23) | (0 : 4) |
| | S-197[†] | S-197 | -ND- | Yes | (0 : 6) | (0 : 6) | (0 : 5) | -ND- | -ND- |
| | S-334 | S356-334 | -ND- | **No** | (0 : 50) | (0 : 51) | (0 : 3) | -ND- | -ND- |
| | S-343A, S-343B | US41-25 | -ND- | **No** | (0 : 18) | (0 : 17) | (0 : 6) | -ND- | -ND- |
| | S-344 | S344 | -ND- | **No** | (0 : 4) | (0 : 4) | (0 : 5) | -ND- | -ND- |
| C-111 Basin | S-176 | S332DX | S332DX used as surrogate for this station" | | | | | | |
| | S-177 | S177 | -ND- | **No** | (0 : 42) | (0 : 42) | (0 : 7) | (0 : 40) | -ND- |
| | S-178 | S178 | -ND- | **No** | (0 : 35) | (0 : 35) | (0 : 7) | (0 : 22) | -ND- |
| | S-331, S-173 | S331-173 | -ND- | **No** | (0 : 52) | (0 : 51) | (0 : 4) | -ND- | -ND- |
| **Totals** | | | (0 : 89) | (**23 No** : 5 Yes) | (0 : 838) | (0 : 836) | (0 : 343) | (0 : 162) | (0 : 16) |

First number in parenthesis indicates number of excursions; second number indicates the total number of samples.
Bold items indicate excursions from state Class III criteria.
-ND- indicates that no data were collected, because monitoring is not required at the site for the associated parameter.

### *Dissolved Oxygen*

Previously, DO of 5.0 milligrams per liter was the Florida Class III criterion for fresh surface water. DO concentrations below 5.0 milligrams per liter (mg/L) occur commonly throughout the EPA, including at interior marsh sites minimally impacted by nutrient enrichment or cattail invasion. Frequent DO levels below 5.0 mg/L are typical in macrophyte-dominated wetlands where photosynthesis and respiration result in wide diel swings in DO levels. As a result, a new Class III freshwater water quality standard was authorized on 8/1/2013, which states that no more than 10 percent of the daily average percent DO saturation values shall be below 38 percent in the Everglades Bioregion for daily data (62-302.533 FAC) or for instantaneous data (discrete measurements) the percent DO saturation values shall not exceed the limit based on the calculated time-day specific translation (FDEP 2013).

The Class III surface water standard for DO was used to evaluate DO data for WY2014. If Class III excursions are observed at upstream structures, the SSAC for DO can be used to determine impacts (if any) on the receiving waters of the downstream marsh. Because natural levels commonly fall below the existing standard, the FDEP has adopted a SSAC for DO in the EPA that better reflects naturally occurring conditions (see Volume I, Chapter 3A). Since a single-value criterion does not adequately account for the wide-ranging natural daily fluctuations observed in the Everglades marshes, the SSAC provides a mechanism to account for the major factors (e.g., time of day and season) that influence natural background DO variation in the Everglades (Weaver, 2004). The SSAC is based on an algorithm that uses sample collection time and water temperature to model the observed natural sinusoidal diel cycle and seasonal variability. This model provides a lower DO limit (DOL) for an individual monitoring station, and is described by the following equation:

$$DOL = [-3.70 - \{1.50 \cdot \sin(2\pi/1440 \cdot t_i) - (0.30 \cdot \sin[4\pi/1440 \cdot t_i])\} + 1/(0.0683 + 0.00198 \cdot C_i + 5.24 \cdot 10^{-6} \cdot C_i^2)] - 1.1$$

Where:

$DOL_i$ = lower limit for the $i^{th}$ annual DO measurement in mg/L

$t_i$ = sample collection time in minutes (Eastern Standard Time) since midnight of the $i^{th}$ annual DO measurement

$C_i$ = water temperature associated with the $i^{th}$ annual DO measurement in degrees Celsius (°C)

The SSAC is assessed based on a comparison between the annual average measured DO concentration and the average of the corresponding DO limits specified by the equation above. Twenty-three sites did not meet the DO saturation criteria among the 28 individual monitoring stations. Compliance with the DO SSAC at marsh stations is analyzed in Volume I, Chapter 3A. A summary table for individual marsh stations in the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge), Water Conservation Areas (WCAs) 2 and 3, and Everglades National Park (ENP or Park) is provided in Volume I, Appendix 3A-3. Based on results of the SSAC analysis, seven interior stations (LOXA105, LOX4, X1, LOXAZ1, LOXAZ2 in Refuge, WCA2F1 for WCA-2, and CA318 for WCA-3) and one Rotenberger station (ROTC3) exceeded the DO SSAC. All downstream marsh stations immediately below the Non-ECP structures met the DO SSAC criterion. Therefore, it appears that discharges from the upstream Non-ECP structures did not impact any downstream marsh monitoring stations.

### *Specific Conductance*

During WY2014, specific conductance was measured in 838 samples collected from the monitoring sites. The criteria for Class III waters requires that specific conductance not exceed a level greater than 50 percent above background, or 1,275 micromhos per centimeter (µmhos/cm), whichever is greater. There were no Class III criterion excursions for specific conductance.

### *pH*

The pH of a solution is defined as the negative base-10 logarithm of the hydrogen ion activity, and can range from 0 (very acidic) to 14 (very alkaline). For freshwater systems, the Class III criterion for pH ranges from 6.0 to 8.5 units. For WY2014, no sample exhibited an excursion for the pH criterion among the 836 samples measured.

### *Alkalinity*

The criterion for Class III waters requires that alkalinity not be below 20 mg/L. Alkalinity was deleted from the ENP Inflows East monitoring plan, dated April 1, 2008; none of the 89 sample values were flagged as a potential excursion in previous years. Alkalinity does not appear to be a parameter of concern, as excursions have only occurred once during the past 17 water years.

### *Turbidity*

The criterion for Class III waters requires that turbidity not exceed 29 nephelometric turbidity units (NTU) above natural background conditions. In general, the median value can be used to determine average background levels on a site-to-site basis for Non-ECP monitoring locations, to compare the measured turbidity at a site with Class III criteria. For instance, if background levels at a particular location indicate a median turbidity level of approximately 3 NTU, and a turbidity value of 30 NTU was measured, this would indicate that the measurement is 27 NTU above background levels. This measurement would not be considered an excursion, although the 30 NTU measurement might be construed as exceeding the criterion in the absence of sufficient background data to calculate a median value for comparison. There were no excursions for turbidity for the 343 samples collected during WY2014, as shown in **Table 4**.

## Total Phosphorus

The Non-ECP permit established the monitoring schedule shown in Attachment D for the collection of TP at Non-ECP structures. Sampling is accomplished mainly through a grab sample collection program. Grab samples are collected biweekly for a majority of the structures when flow is occurring at the structures; otherwise, collection is conducted at least once a month. A few exceptions exist for some Non-ECP structures, where sampling is conducted biweekly only during flow events. Nutrients are the most frequently sampled parameters in the Non-ECP monitoring program. Since October 2009, grab samples were taken biweekly at S-38, S-39, S-145, and S-11A when there was recorded flow.

During WY2014, autosamplers collected TP samples at the S-9, S-9A, S-18C, S-190, S-140, S-332D, S-333, S-356-334, and S-331-173 structures. Deployment of autosamplers at these locations was previously identified as an improvement in the monitoring program for collecting TP data at "into" structures, Park Inflows East (PIE) and Park Inflows North (PIN). TP data collected for all monitoring locations during WY2014 are plotted in time series in Attachment F. The plots provide a comparison of TP concentration data between WY2014 and previous periods (WY1998–WY2013, EFA baseline, and Non-ECP baseline) to detect changes and trends in TP concentrations at Non-ECP monitoring locations. To assist with evaluation of the TP concentration data for a particular location discharging into, within, or from the EPA, horizontal

lines representing the 10 ppb and 50 ppb concentration levels were added to the TP time series plots. TP concentrations are reported in ppb (or µg/L), unless otherwise noted.

For WY2014, a statistical comparison of TP data for all monitoring locations is presented as notched box-and-whisker plots in **Figures 3** through **6**, which are provided in the following subsections. The figures represent "into" (**Figure 3**), "within" (**Figure 4**), and "from" (**Figure 5**) monitoring locations. Additionally, notched box-and-whisker plots were created for TP concentration data for upstream C-111 Basin monitoring locations (**Figure 6**). Summary statistics for TP data collected for all monitoring locations are presented separately in Attachment E, **Table E-3** (grab and autosampler data are reported separately).

### *"Into" Structures*

The highest TP concentrations for Non-ECP structures discharging directly to the EPA during WY2014 were observed at the Feeder Canal (S-190), followed by the S-140 (L-28 Basin), with median TP concentrations of 32 ppb (grab) and 62 ppb (auto) at S-190, and 37 ppb (grab) and 44 ppb (auto) at S-140. During WY2014, structures S-190 and S-140 discharged 70,369 and 108,403 ac-ft, respectively, into the western portion of Water Conservation Area (WCA)-3A.

The lowest TP concentrations were observed at structures in the C-111 Basin at S-177, S-331–S-173, and S-332D. The S-332D structure is an "into" structure, and S-174 was plugged in September 2007. S-175, S-332, and BERMB3 were modified as "within" structures in December 2003. These structures discharge to the southeastern portion of ENP via the C-111 Canal and Taylor Slough. TP data for these monitoring locations had median concentrations of 4 ppb (grab) and 4 ppb (auto) for S-18C, 5 ppb (grab) and 6 ppb (auto) for S-332D, with 75 percent of the samples having concentrations below 4 ppb (grab), 5 ppb (auto) for S-18C, and 6 ppb (grab) and 7 ppb (auto) for S-332D. During WY2014, the structure discharged 12,598 ac-ft from S-332D, a slight decrease from the previous year (133,137 ac-ft). The S-18C structure discharged approximately 119,024 ac-ft to the lower C-111 Canal, which was also a slight decrease from last year (149,225 ac-ft). S-178 had a median concentration of 14 ppb for grab samples—the highest TP concentration in the C-111 Basin. The structure discharged 690 ac-ft in WY2014.

Structures S-9, S-9A (C-11 West Basin), and G-123 (North New River Canal Basin) discharge directly to the eastern side of WCA-3A. The notched box-and-whisker plot for S-9, which is based on grab sample data, indicates a TP concentration of less than 10 ppb for 75 percent of the data, a median concentration of 9 ppb, and a maximum concentration of 24 ppb (**Figure 3**). Seventy-five percent of the data collected by the autosampler at S-9 was below 15 ppb, with a median concentration of 12 ppb, and a maximum concentration of 24 ppb. The notched box-and-whisker plot for S-9A, which is based on grab-sample data, indicates a TP concentration of less than 11 ppb for 75 percent of the data, a median concentration of 10 ppb, and a maximum concentration of 24 ppb (**Figure 3**). Seventy-five percent of the data collected by the autosampler at S-9A was below 11 ppb, with a median concentration of 10 ppb and a maximum concentration of 22 ppb. The monitoring schedule for structure G-123 requires biweekly grab sampling during flow events; otherwise, the samples are collected monthly. There was no flow during WY2014 at G-123; therefore, no sample was collected from the autosampler. During WY2014, 12 grab samples were collected. The grab samples at G-123 had a median TP concentration of 10.5 ppb. Seventy-five percent of the data collected by grab samples at G-123 was below 18 ppb, with a maximum concentration of 56 ppb.

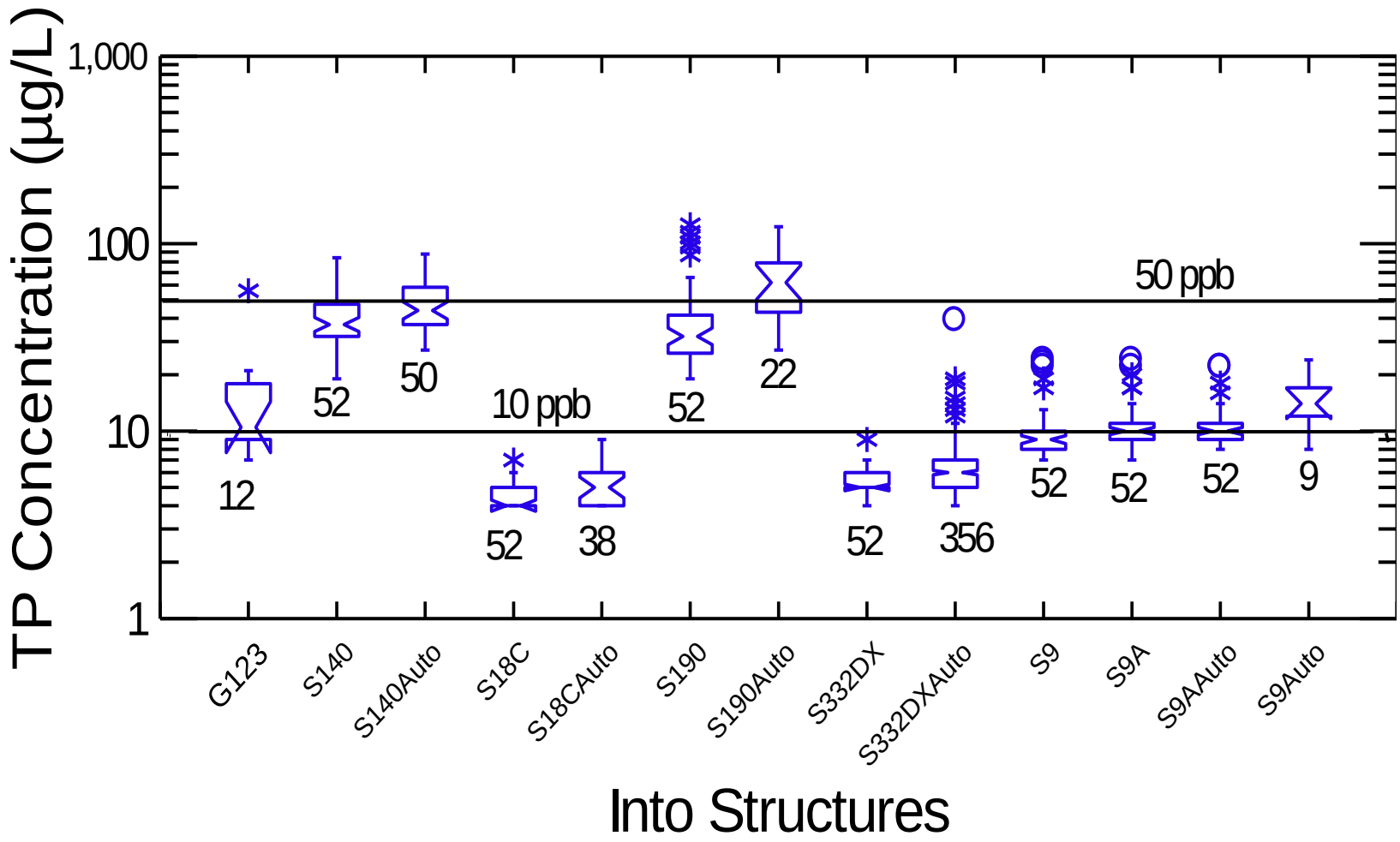



**Figure 3.** Comparison of TP concentrations (flow and no flow) for "into" structures during WY2014.

### *"Within" Structures*

For structures discharging within the EPA during WY2014, low TP concentrations were observed for structures S-12D and S-333, which convey discharges from WCA-3A to ENP (**Figure 4**). The monitoring location for S-12D serves as a surrogate monitoring location for Non-ECP permit structures S-346 and S-347. Median TP concentrations at these monitoring locations were 7 ppb at S-12D, and 8 ppb at S-333, with 75 percent of the data below 9 ppb at S-12D, and 10.5 ppb at S-333. The maximum concentration observed was 12 ppb for S-12D, and 18 ppb at S-333. Discharge volumes for the period were 339,366 ac-ft for S-346 and S-347, and 261,069 ac-ft for S-333.

Structures S-144, S-145, and S-146 convey discharges from WCA-2A to WCA-2B. The structures usually operate simultaneously. The maximum concentration was 15 ppb, the median 6 ppb, and 75 percent of the data (22 samples) were below 9 ppb at S-145. Discharge volumes ranged from 30,911 ac-ft at S-146, to 58,119 ac-ft at S-145.

In addition to monitoring the water quality at S-34, the data from this location are considered representative of water quality conditions for S-141, which conveys discharges from WCA-2B to the North New River Canal just upstream of S-34. TP concentrations from S-34 ranged from 7 ppb to 23 ppb, with a median value of 10.5 ppb. S-142 discharged 198 ac-ft water with a FWM TP concentration of 10 ppb.

The highest TP concentrations were observed at monitoring site C123SR84 (the surrogate location for structures S-339 and S-340), with levels ranging from 12 to 41 ppb, and a median value of 17 ppb. S-151 discharged approximately 167,321 ac-ft during WY2014. TP concentrations ranged from 8 to 18 ppb, with a median value of 10 ppb. S-339 discharged 9,241 ac-ft, and S-340, located upstream of S-151 in the Miami Canal, discharged 100 ac-ft in WY2014.

During WY2014, TP concentration was not monitored at S-332 because there was no flow at this site. S-175 discharged 42 ac-ft, with a FWM TP concentration of 9 ppb. 10 grab samples were collected at BERMB3, with an average TP concentration of 25 ppb. There was no discharge at BERMB3 during the reporting period.

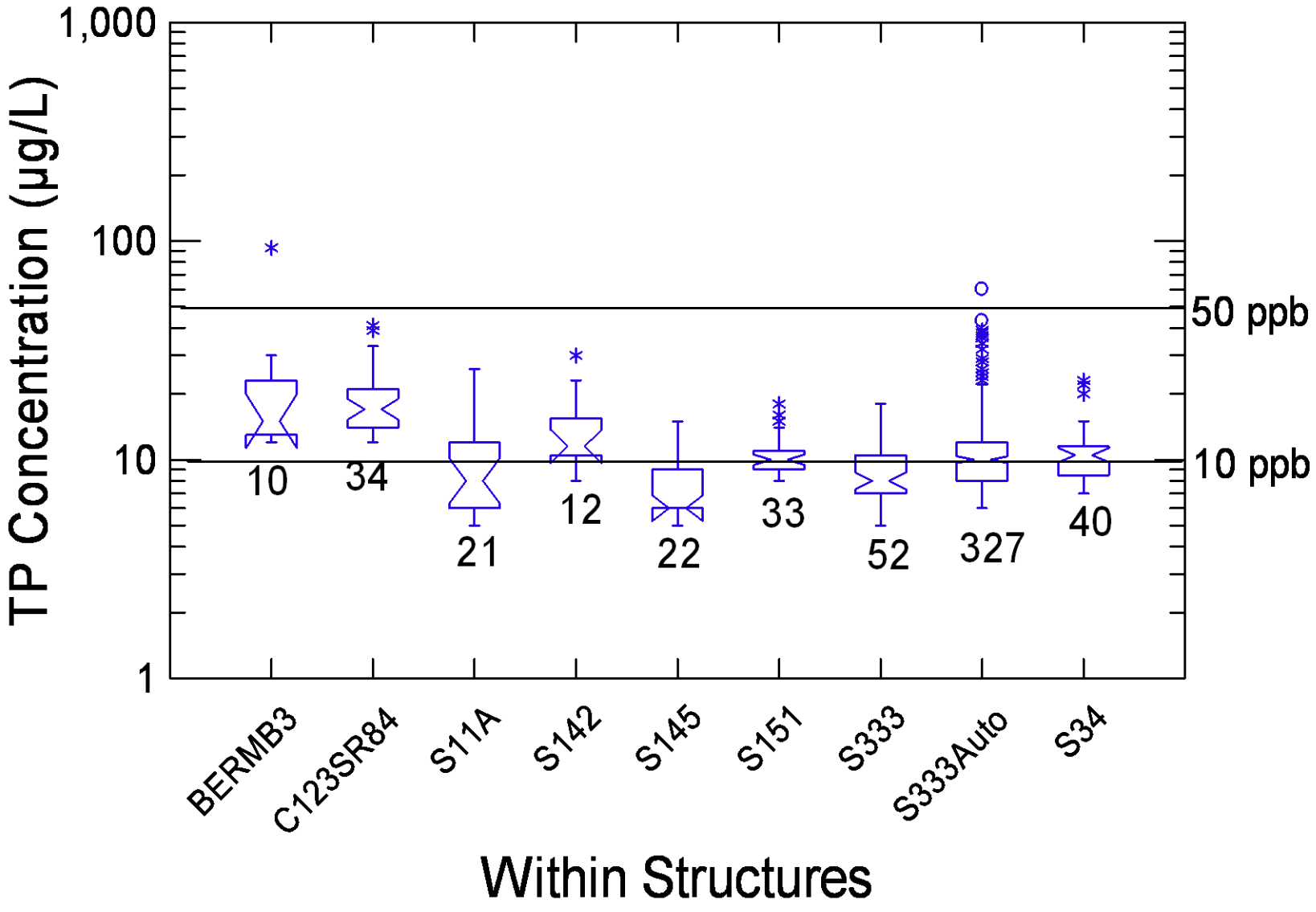



**Figure 4.** Comparison of TP concentrations (flow and no flow) for "within" structures during WY2014.

### *"From" Structures*

TP concentrations observed during WY2014 for structures classified as "from" are summarized in the notched box-and-whisker plot shown in **Figure 5**. No water quality sample was collected at structure G-94D (there was no flow at this structure). G-94B exhibited the highest TP concentrations, which ranged from 18 to 60 ppb. The median TP concentration at G-94B was 29 ppb, with 75 percent of the data below 39 ppb. G-94B is also the surrogate sampling site for G-94A and G-94C. All three structures, which are owned and maintained by the District and operated by the Lake Worth Drainage District (LWDD), are located at the L-40 Levee on the eastern side of the Arthur R. Marshall Loxahatchee National Wildlife Refuge (LNWR) and provide water supply releases from LNWR to the LWDD. When open, G-94A, G-94B, and G-94C allow interior LWDD canals to fill. The direction of flow typically has been toward the LWDD canal system. Water supply releases to LWDD canals during WY2014 were 1,946 ac-ft at G-94A, 2,583 ac-ft at G-94B, 12,765 ac-ft at G-94C, and no flow at G-94D. Maintenance for structures G-94A, G-94C, and G-94D was performed from June to October 2013. G-94B is slated for removal, after which two new stations will be added to monitor G-94A and G-94C individually.

In WY2014, TP concentrations observed at S-39 ranged from 11 to 37 ppb, with a median value of 17 ppb. The structure discharged approximately 122,605 ac-ft. During this period, 52 grab samples and 340 samples from the auto sampler were collected at S356-334. At this location, TP concentrations ranged from 5 to 21 ppb (grab) and from 6 to 265 ppb (auto), with a median concentration of 9 ppb for grab and 9 ppb for auto. The TP concentrations observed at S-31 ranged from 6 to 17 ppb, with a median value of 10 ppb. The structure discharged 102,612 ac-ft in WY2014. TP concentrations observed at S-34 ranged from 7 to 23 ppb, with a median value of 10.5 ppb. The structure discharged approximately 42,630 ac-ft. TP concentrations observed at S-38 ranged from 5 to 18 ppb, with a median value of 7 ppb. The structure discharged approximately 226,785 ac-ft. TP concentrations observed at US41-25—a surrogate station for the S-343A and S-343B structures—ranged from 6 to 36 ppb, with a median value of 13 ppb. Structure G-343A discharged 33,588 ac-ft, and S-343B discharged 48,601 ac-ft, during WY2014. S-344 had the highest TP concentration. 75 percent of TP concentrations observed at S-344 were below 44 ppb, with a median of 17 ppb.

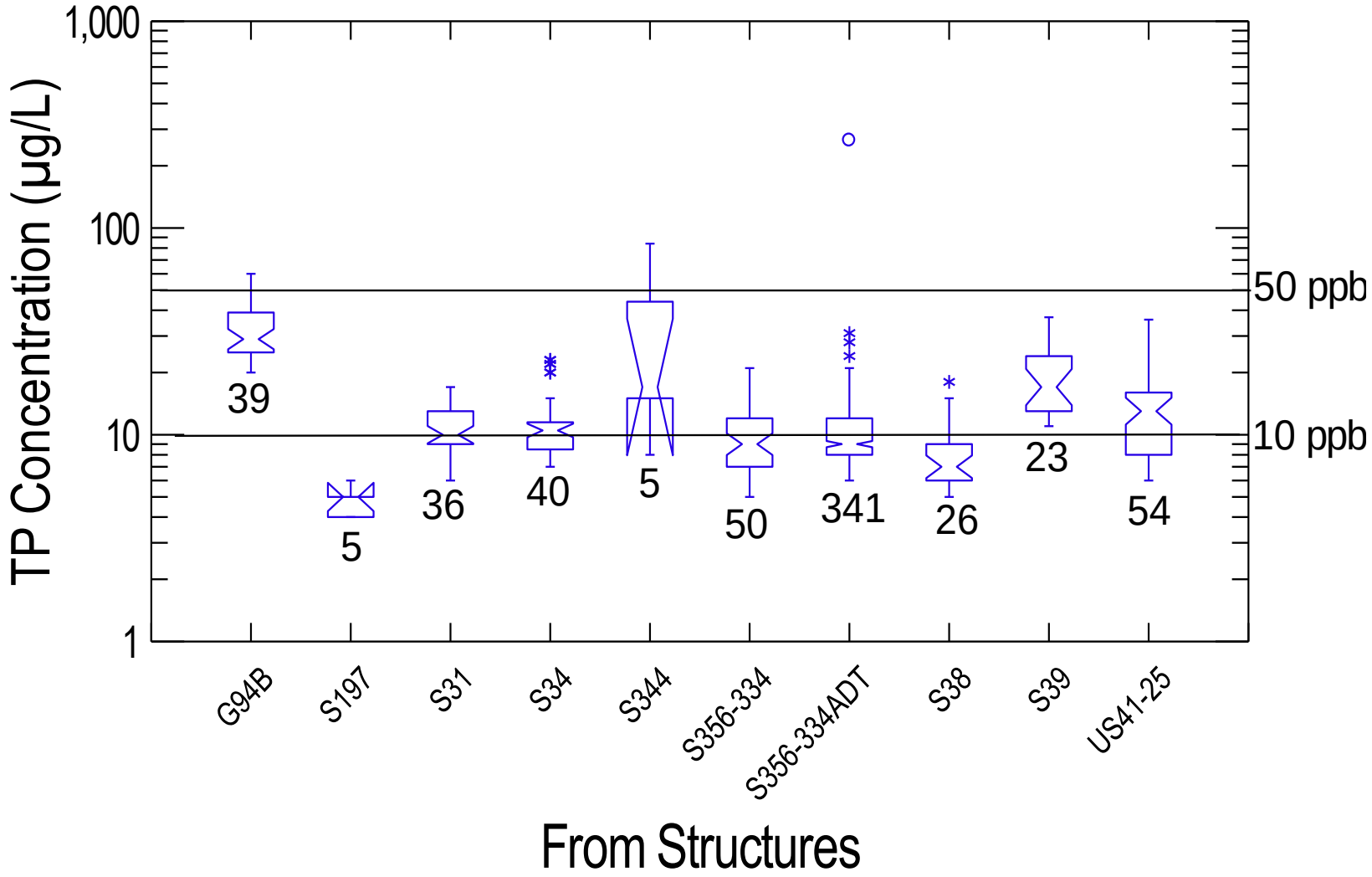



**Figure 5.** Comparison of TP concentrations (flow and no flow) for "from" structures during WY2014.

### *C-111 Basin Upstream Structures*

S-176, S-177, S-178, and S-331/S-173, shown in **Figure 6**, are C-111 Basin structures located upstream of "into" structures S-18C and S-332D. For S-331/S-173, 75 percent of TP data was below 7 ppb for grab, and 9 ppb for auto, with the median value of 6 ppb for grab and 7 ppb for auto. S-332DX is a surrogate of S-176. 75 percent of TP data collected there was below 6 ppb for grab and 7 ppb for auto, with a median of 5 ppb for grab and 6 ppb for auto. For S-177, 75 percent of the TP data was below 7 ppb, with a median of 5 ppb. The maximum TP measured at S-178 was 45 ppb, with a median TP concentration of 14 ppb for grab samples, which was higher than the rest of the C-111 Basin upstream structures. In WY2014, 690 ac-ft was discharged at S-178. Grab samples were collected upstream of the structure.

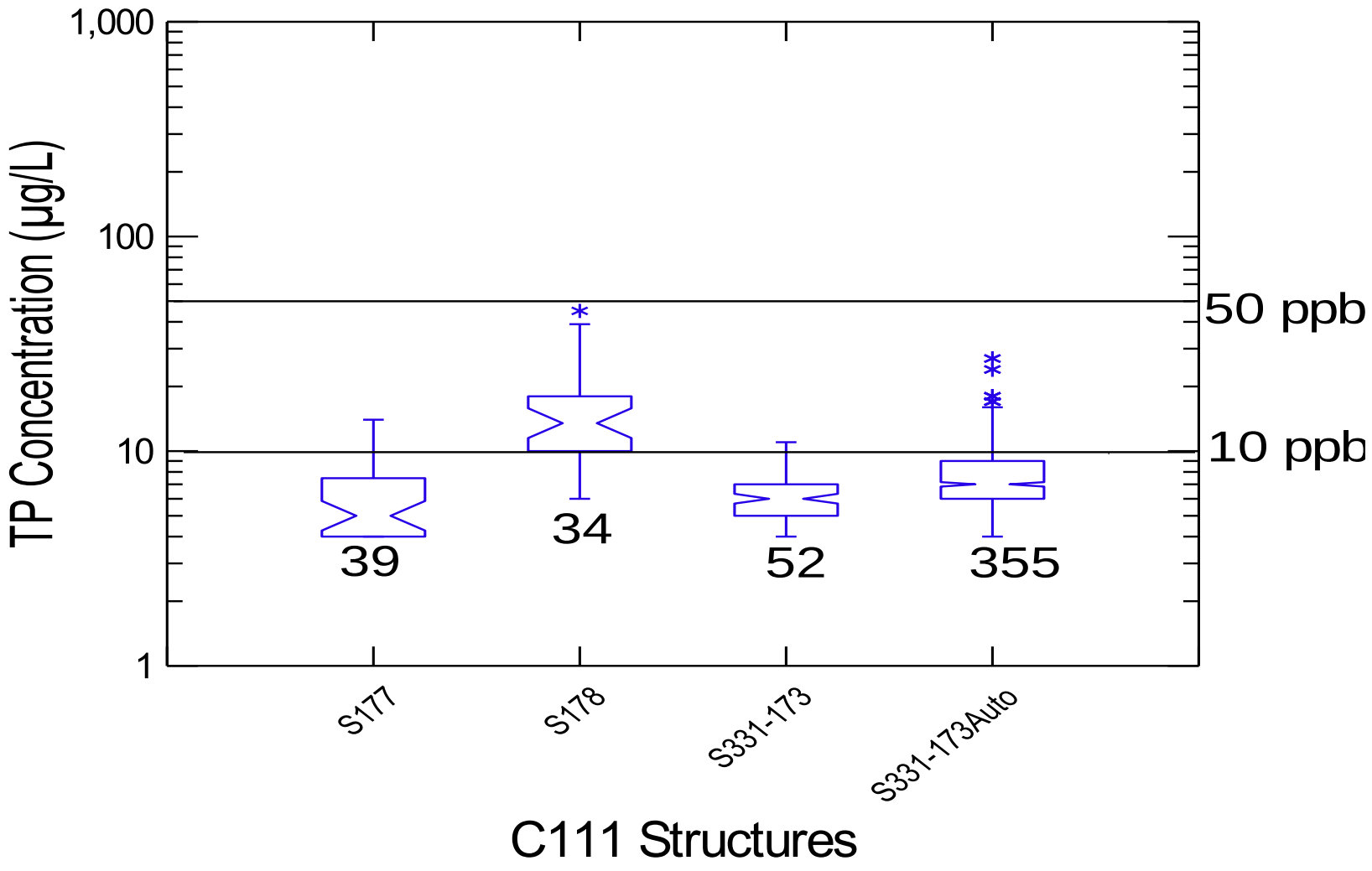



**Figure 6.** Comparison of TP concentrations (flow and no flow) for C-111 structures during WY2014.

### *Flow-Weighted Mean Total Phosphorus Concentrations for All Structures*

Extending the analysis from previous water years, FWM TP concentrations were calculated for Non-ECP structures during WY2014. FWM TP concentrations were collected only for those structures having sufficient TP data and available flow data for WY2014. The annual FWM TP concentrations and monthly and annual flow volumes for the "into," "within," "from," and C-111 Basin structures during WY2014 are provided in Attachment D, Table D-3**.** A more detailed analysis of the WY2014 annual FWM TP concentration data for each into structure is shown in **Table 5**. The calculations use an algorithm to estimate TP concentrations on all days with positive flow for which no observed values are available.

**Table 5** presents results for the FWM TP concentrations at "into" sites during WY2014. The highest FWM TP concentration for the "into" structures during WY2014 was observed in the Feeder Canal Basin at S-190 (76 ppb), and at the L-28 Basin at S-140 (47 ppb). S-9 and S-9A had FWM TP concentrations of 17 and 11 ppb, respectively, which are similar to the WY2013 FWM TP of 16 ppb at S-9 and 11 ppb at S-9A. The Feeder Canal and L-28 are designated as sites of concern for TP, and the C-11 West Basin is designated as a site of potential concern for TP.

The lowest FWM TP concentrations were observed in the C-111 Basin at S-332D (7 ppb) and at S-18C (5 ppb). These monitoring locations are the subject of interim and long-term compliance limits stipulated in the federal Settlement Agreement. Currently, there is no concern for TP in the C-111 Basin.

**Table 5.** Annual flow-weighted mean TP concentrations and TP loads for WY2014.

| Basin | Structure | Water Quality Station | Total Flow (ac-ft) | Days with Positive Flow | Sample Type | Sample Size (Grab) | Arithmetic Average (Grab)(ppb) | Sample Size (Auto) | Arithmetic Average (Flow)(ppb) | Arithmetic Average (Non-Flow)(ppb) | Flow-Weighted Mean Concentration (ppb) | TP Load (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North New River | G-123[4] | G123 | 0 | 0 | Auto[2] & Grab[1] | 12 | 16 | 0 | N/F[3] | 16 | N/F[3] | 0 |
| C-11 West | S-9 | S9 | 90,053 | 102 | Auto[2] & Grab[1] | 52 | 10 | 9 | 14 | 9 | 17 | 1,940 |
| | S-9A | S9A | 86,140 | 343 | Auto[2] & Grab[1] | 52 | 11 | 52 | 11 | 19 | 11 | 1,148 |
| C-111 | S-332D | S-332DX | 127,598 | 297 | Auto[2] & Grab[1] | 52 | 5 | 357 | 6 | 6 | 7 | 1,046 |
| | S-18C | S18C | 119,024 | 310 | Auto[2] & Grab[1] | 52 | 4 | 38 | 4 | 5 | 5 | 661 |
| L-28 | S-140 | S140 | 108,403 | 285 | Auto[2] & Grab[1] | 52 | 41 | 50 | 46 | 41 | 47 | 6,235 |
| Feeder Canal | S-190 | S190 | 70,369 | 158 | Auto[2] & Grab[1] | 52 | 41 | 22 | 59 | 29 | 76 | 6,607 |

Notes:

1) Grab indicates samples collected by grab sampling methodology.

2) Auto indicates that samples were collected by automatic composite samplers.

3) N/F indicates no flow.

4) Structure G-123 had not discharged since WY2004 and the structure pumps were removed circa 2008. The structure's pumps have not been replaced and the District has determined the structure is no longer needed. Therefore, the North New River Canal Basin cannot discharge to the EPA and will no longer be considered a Non-ECP Basin.

## PESTICIDES IN SURFACE WATER AND SEDIMENT

The quarterly surface water and semiannual sediment pesticide sampling events at the 11 Non-ECP sites (**Figure 3**) for WY2014 were conducted in June 2013, September 2013, October 2013, and January 2014. The Non-ECP permit requires sampling at S-142 only during discharge or flow events. For this reporting period, samples were not collected for any of the sampling events. Representative MDLs and PQLs for the pesticide analytes are listed in **Table 6**. The FDEP Central Laboratory in Tallahassee, FL performed all the pesticide analyses. Refer to the Quality Assurance Evaluation section of the individual pesticide event reports for a summary of any limitations on data validity that might influence the utility of the data. The individual reports can be found on the District's website (www.sfwmd.gov) under the *Scientist & Engineers, Environmental Monitoring* section, and the *Pesticide Reports* link.

To evaluate potential impacts on aquatic life resulting from intermittent pesticide exposure, the maximum observed concentration was compared to the criterion maximum concentration published by the U.S. Environmental Protection Agency (USEPA) under Section 304 (a) of the Clean Water Act (CWA), and as promulgated in Chapter 62-302, F.A.C. For compounds not specifically listed, Rule 62-302.200, F.A.C., allows for acute and chronic toxicity standards. These standards are calculated as one-third and one-twentieth, respectively, of the amount lethal to 50 percent of the test organisms in 96 hours, where the 96-hour $EC_{50}$ or $LC_{50}$ is the lowest value determined for a species significant to the indigenous aquatic community. **Table 7** lists representative toxicity levels for selected freshwater aquatic invertebrates and fishes.

**Table 8** lists the pesticides detected in surface water samples collected during WY2014. Four surface water samples were collected at each site and analyzed for all parameters. Pesticides with concentrations greater than their respective Class III criteria or toxicity limits were considered to be in the "concern" excursion category, whereas those higher than the PQL were considered to be in the "potential concern" excursion category. None of the detected concentrations were at levels of "concern".

**Table 9** lists the pesticides detected in sediment samples collected during WY2014. Two sediment samples were collected at each site and analyzed for all parameters. Pesticides with concentrations greater than the PQL were considered to be in the "potential concern" excursion category. Dichlorodiphenyldichloroethylene (DDE), the environmental dehydrochlorination product of DDT, was detected at two locations (S-9 and S-178) at a level of "potential concern." Also the detected concentrations of PCB-1242 at G-123, PCB-1254 at S-140, and PCB-1260 at S-9, were at a level of "potential concern".

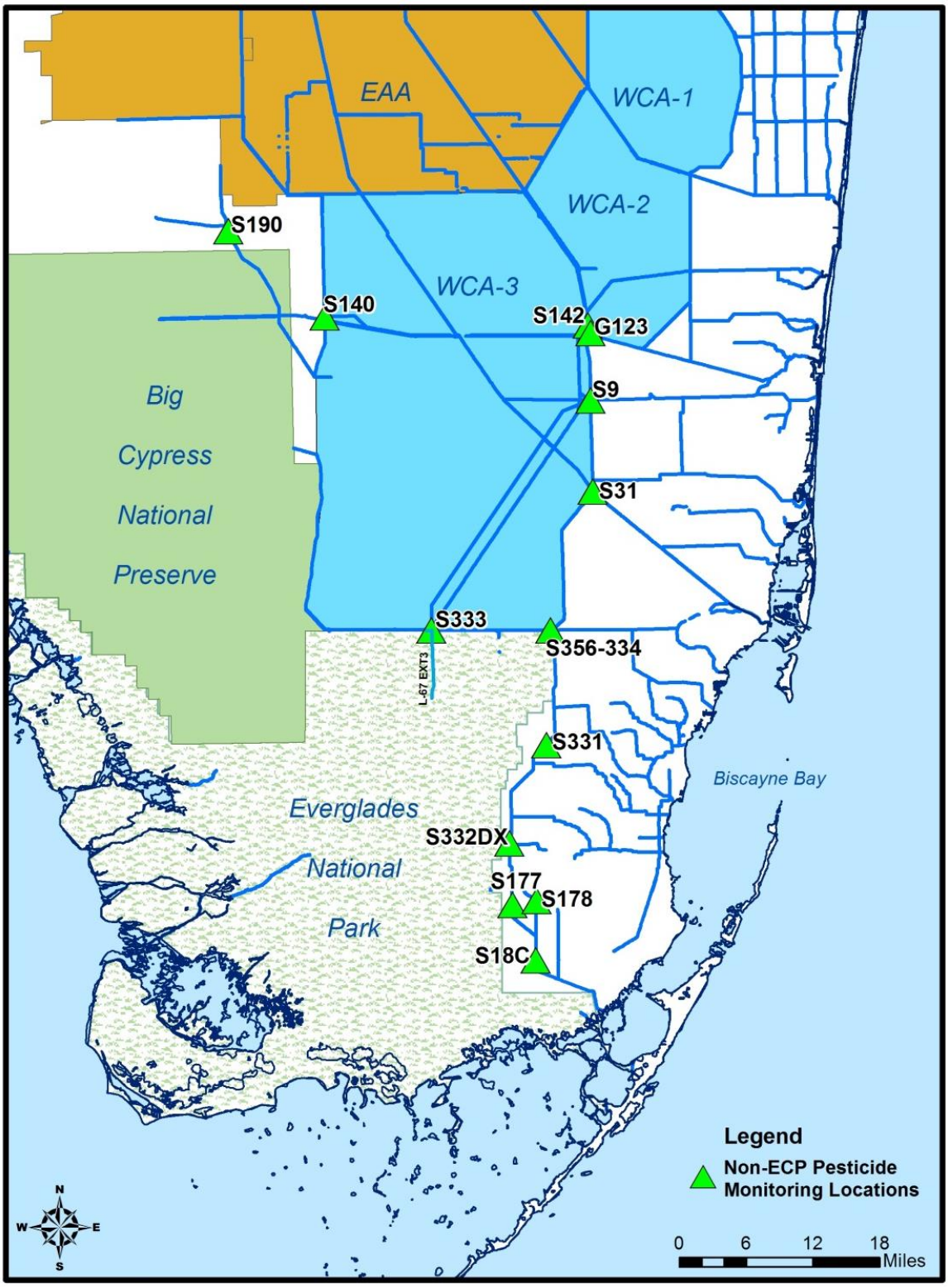



**Figure 7.** The pesticide monitoring network for Non-ECP structures.

**Table 6.** Pesticide method detection limits (MDLs) and practical quantitation limits (PQLs) determined in January 2014.

| Pesticide or Metabolite | Water: Range of MDLs - PQLs (µg/L) | Sediment: Range of MDLs - PQLs (µg/Kg) | Pesticide or Metabolite | Water: Range of MDLs - PQLs (µg/L) | Sediment: Range of MDLs - PQLs (µg/Kg) |
|---|---|---|---|---|---|
| 2,4-D | 0.002-0.01 | 8.7-71 | endrin aldehyde | 0.0038-0.016 | 0.89-9.8 |
| 2,4,5-T | 0.002-0.01 | 8.7-71 | ethion | 0.0095 - 0.04 | 2.2-24 |
| 2,4,5-TP (silvex) | 0.002-0.01 | 8.7-71 | ethoprop | 0.0047 - 0.02 | 1.1-12 |
| acifluorfen | 0.002-0.01 | 8.7-71 | fenamiphos | 0.028 - 0.12 | 4.5-49 |
| alachlor | 0.057-0.24 | 16-180 | fonofos | 0.0095 - 0.04 | 1.1-12 |
| aldrin | 0.0019 - 0.008 | 0.45 - 4.9 | heptachlor | 0.0019 - 0.008 | 0.45-4.9 |
| ametryn | 0.0095 - 0.04 | 2.2-62 | heptachlor epoxide | 0.0019 - 0.008 | 0.45-4.9 |
| atrazine | 0.0095 - 0.04 | 2.2-24 | hexazinone | 0.028 - 0.12 | 6.7-7.3 |
| atrazine desethyl | 0.0095 - 0.04 | N/A | imidacloprid | 0.002 - 0.01 | N/A |
| atrazine desisopropyl | 0.0095 - 0.04 | N/A | linuron | 0.002 - 0.01 | 1.3-15 |
| azinphos methyl (guthion) | 0.019-0.08 | 6.7-73 | malathion | 0.0095-0.04 | 2.2-24 |
| Bentazon | 0.002-0.01 | N/A | metalaxyl | 0.038-0.16 | N/A |
| α-BHC (alpha) | 0.0019 - 0.008 | 0.45 - 4.9 | methamidophos | N/A | 8.9-98 |
| β-BHC (beta) | 0.0019 - 0.008 | 0.45 - 4.9 | methoxychlor | 0.0095 - 0.04 | 3.1-34 |
| δ-BHC (delta) | 0.0019 - 0.008 | 0.45 - 4.9 | metolachlor | 0.057 - 0.24 | 13-150 |
| γ-BHC (gamma) (lindane) | 0.0019 - 0.008 | 0.45 - 4.9 | metribuzin | 0.019 - 0.08 | 4.5-49 |
| bromacil | 0.038 - 0.16 | 13-150 | mevinphos | 0.0095 - 0.04 | 2.2-24 |
| butylate | 0.019 - 0.08 | N/A | mirex | 0.0038 - 0.016 | 0.89-9.8 |
| carbophenothion (trithion) | 0.0057 - 0.024 | 1.3-15 | monocrotophos | N/A | 2.7-29 |
| chlordane | 0.019 - 0.08 | 4.5-120 | naled | 0.038 - 0.16 | 8.9-98 |
| chlorothalonil | 0.0076 - 0.032 | 1.3-15 | norflurazon | 0.028 - 0.12 | 6.7-7.3 |
| chlorpyrifos ethyl | 0.0095 - 0.04 | 2.2-24 | parathion ethyl | 0.019 - 0.08 | 2.2-24 |
| chlorpyrifos methyl | 0.0095 - 0.04 | 2.2-24 | parathion methyl | 0.0095 - 0.004 | 2.2-24 |
| cypermethrin | 0.011 - 0.048 | 2.2-24 | PCB-1016 | 0.019 - 0.08 | 4.5-49 |
| DDD-P,P' | 0.0038 - 0.016 | 0.89-25 | PCB-1221 | 0.019 - 0.08 | 8.9-98 |
| DDE-P,P' | 0.0038 - 0.016 | 0.89-49 | PCB-1232 | 0.019 - 0.08 | 4.5-49 |
| DDT-P,P' | 0.0038 - 0.016 | 1.3-38 | PCB-1242 | 0.019 - 0.08 | 4.5-49 |
| demeton | 0.023 - 0.096 | 2.7-29 | PCB-1248 | 0.019 - 0.08 | 4.5-49 |
| diazinon | 0.0095-0.04 | 2.2-24 | PCB-1254 | 0.019 - 0.08 | 6.7-73 |
| dicofol (kelthane) | 0.023 - 0.096 | 5.4-83 | PCB-1260 | 0.019 - 0.08 | 4.5-49 |
| dieldrin | 0.0019 - 0.008 | 0.45-4.9 | permethrin | 0.0094 - 0.04 | 2.2-24 |
| disulfoton | 0.0047 - 0.02 | 1.1-12 | phorate | 0.0047 - 0.02 | 1.1-22 |
| diuron | 0.002-0.01 | 1.3-15 | prometon | 0.019 - 0.08 | N/A |
| α-endosulfan (alpha) | 0.0019 - 0.016 | 0.45 - 4.9 | prometryn | 0.019 - 0.08 | 4.5-49 |
| β-endosulfan (beta) | 0.0019 - 0.016 | 0.45 - 4.9 | simazine | 0.0095 - 0.04 | 2.2-24 |
| endosulfan sulfate | 0.0038 - 0.016 | 0.89-9.8 | toxaphene | 0.095 - 0.4 | 27-290 |
| endrin | 0.0038 - 0.016 | 1.4-16 | trifluralin | 0.0076 - 0.032 | 1.8-20 |

N/A – Not analyzed

**Table 7.** Toxicity of pesticides (in µg/L) to selected freshwater aquatic invertebrates and fishes.
[Note: For the pesticides monitored, there is no 96 hr $LC_{50}$ data available for largemouth bass (Micropterus salmoides). Numbers in parenthesis correspond to the references listed in the table footnotes].

| | Water Flea *(Daphnia magna)* | | | Fathead Minnow # *(Pimephales promelas)* | | | Bluegill *(Lepomis macrochirus)* | | | Rainbow Trout # *(Oncorhynchus mykiss)* | | | Channel Catfish *(Ictalurus punctatus)* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pesticide Common Name** | **48 hr $EC_{50}$** | **Acute Toxicity *** | **Chronic Toxicity *** | **96 hr $LC_{50}$** | **Acute Toxicity** | **Chronic Toxicity** | **96 hr $LC_{50}$** | **Acute Toxicity** | **Chronic Toxicity** | **96 hr $LC_{50}$** | **Acute Toxicity** | **Chronic Toxicity** | **96 hr $LC_{50}$** | **Acute Toxicity** | **Chronic Toxicity** |
| 2,4-D | 25,000 (4) | 8,333 | 1,250 | 133,000 (4) | 44,333 | 6,650 | 180,000 (5) | 60,000 | 9,000 | 100,000 (2) | 33,333 | 5,000 | - | - | - |
| | | | | | | | 900 (48 hr) (3) | - | - | 110,000 (4) | 36,667 | 5,500 | | | |
| Ametryn | 28,000 (4) | 9,333 | 1,400 | 16,000 (7) | 5,333 | 800 | 4,100 (2) | 1,367 | 205 | 8,800 (2) | 2,933 | 440 | - | - | - |
| | | | | | | | | | | 3,600 (7) | 1,200 | 180 | | | |
| Atrazine | 6900 (4) | 2,300 | 345 | 15,000 (4) | 5,000 | 750 | 16,000 (2) | 5,333 | 800 | 8,800 (2) | 2,933 | 440 | 7,600 (2) | 2,533 | 380 |
| | | | | | | | | | | 5,300 (8) | 1,767 | 265 | | | |
| Bentazon | 100,000 (11) | 33,333 | 5,000 | - | - | - | 100,000 (11) | 33,333 | 5,000 | 100,000 (11) | 33,333 | 5,000 | - | - | - |
| DDE-p,p' | - | - | - | - | - | - | 240 (1) | 80 | 12 | 32 (1) | 10.7 | 2 | - | - | - |
| Diuron | 1,400 (4)(9) | 467 | 70 | 14,200 (4) | 4,733 | 710 | 5,900 (2) | 1,967 | 295 | 5,600 (2) | 1,867 | 280 | - | - | - |
| | | | | 14,000 (9) | 4,667 | 700 | | | | | | | | | |
| Hexazinone | 151,600 (4)(10) | 50,533 | 7,580 | 274,000 (2)(10) | 91,333 | 13,700 | 100,000 (4) | 33,333 | 5,000 | 180,000 (4) | 60,000 | 9,000 | - | - | - |
| | | | | | | | 505,000 (10) | 168,333 | 25,250 | >320,000 (10) | >106,667 | - | | | |
| Imidacloprid | 85,200 (6) | 28400 | 4260 | - | - | - | - | - | - | 83,000 (6) | 27,667 | 4,150 | - | - | - |
| Simazine | 1,100 (4) | 367 | 55 | 100,000 (4) | 33,333 | 5,000 | 90,000 (2) | 30,000 | 4,500 | 100,000 (4) | 33,333 | 5,000 | - | - | - |

# Species is not indigenous. Information is given for comparison purposes only.
* Florida Administrative Code (FAC) 62-302.200, for compounds not specifically listed, acute and chronic toxicity standards are calculated as one-third and one-twentieth, respectively, of the amount lethal to 50% of the test organisms in 96 hours, where the 96 hour $LC_{50}$ is the lowest value which has the test organisms in 96 hours, where the 96 hour $LC_{50}$ is the lowest value which has been determined for a species significant to the indigenous aquatic community.

(1) Johnson and Finley (1980)
(2) Hartley and Kidd (Eds.) (1987)
(3) Verschueren (1983)
(4) U.S. Environmental Protection Agency (1991)
(5) Mayer and Ellersieck (1986)
(6) U.S. Environmental Protection Agency (1994 a)
(7) U.S. Environmental Protection Agency (2005)
(8) U.S. Environmental Protection Agency (2006)
(9) U.S. Environmental Protection Agency (2003)
(10) U.S. Environmental Protection Agency (1994 b)
(11) U.S. Environmental Protection Agency (1994 c)

**Table 8.** Pesticide detections and excursions for surface water samples collected from June 2013 to January 2014[a].

| Structure | 2,4-D | Ametryn | Atrazine | Atrazine Desethyl | Bentazon | Diuron | Hexazinone | Imidacloprid | Simazine |
|---|---|---|---|---|---|---|---|---|---|
| G-123 | 1:0:0* | 1:0:0 | 0:1:0 | 1:0:0 | 0:3:0 | -- | -- | -- | -- |
| S-9 | 0:3:0 | -- | 1:1:0 | 1:0:0 | 1:2:0 | 2:1:0 | -- | 0:3:0 | -- |
| S-18C | -- | -- | -- | -- | 2:0:0 | -- | -- | 1:0:0 | -- |
| S-140 | 1:1:0 | -- | 1:0:0 | -- | 0:1:0 | 2:1:0 | 1:0:0 | 2:1:0 | 1:0:0 |
| S-190 | 1:0:0 | -- | -- | -- | -- | 1:0:0 | 1:0:0 | -- | -- |
| S-31 | 0:2:0 | 1:0:0 | 1:1:0 | -- | 0:3:0 | 2:0:0 | -- | 1:1:0 | -- |
| S-332DX | 1:0:0 | -- | -- | -- | 2:1:0 | -- | -- | -- | -- |
| S-177 | -- | -- | -- | -- | 3:0:0 | -- | -- | 1:0:0 | -- |
| S-178 | 1:0:0 | -- | 1:0:0 | -- | 0:3:0 | -- | -- | 2:0:0 | -- |
| S-331 | 2:0:0 | -- | 1:0:0 | -- | 1:2:0 | 1:0:0 | -- | -- | -- |

[a] Four samples were collected for each site and analyzed for all parameters. Table cells only represent concentrations above the detection limit.

* Number of samples $\leq$ PQL (no concern); number of samples > PQL (potential concern); and number of samples exceeding criterion or toxicity limit (concern).

**Table 9.** Pesticide detections and excursions for sediment samples collected in July 2013 and January 2014[a].

| Structure | DDE-p,p' | PCB-1242 | PCB-1254 | PCB-1260 |
|---|---|---|---|---|
| G-123 | - | 0:1 | - | - |
| S-9 | 0:1* | - | - | 0:1 |
| S-18C | - | - | - | - |
| S-140 | - | - | 0:1 | - |
| S-190 | - | - | - | - |
| S-31 | 1:0 | - | - | - |
| S-332DX | - | - | - | - |
| S-177 | 2:0 | - | - | - |
| S-178 | 1:1 | - | - | - |
| S-331 | 1:0 | - | - | - |

[a] Two sediment samples were collected for each site (except S142) and analyzed for all parameters. Table cells only represent concentrations above the detection limit.

* Number of samples < PQL (no concern); and number of samples > PQL (potential concern).

# REFERENCES

Akpoji, G.A., E. Damisse, M. Imru, C. James and N.D. Mtundu. 2003. Standard Operating Procedures for Flow Data Management in the District's Hydrologic Database. Hydrology and Hydraulics Division, Environmental Monitoring and Assessment Department, South Florida Water Management District, West Palm Beach, FL.

Hartley, D. and H. Kidd. (Eds.). 1987. The Agrochemicals Handbook. Second Edition, The Royal Society of Chemistry. Nottingham, England.

Johnson, W.W. and M.T. Finley. 1980. Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates. U.S. Department of the Interior, Fish and Wildlife Service Resource Publication 137. Washington, DC.

Mayer, F.L., and M.R. Ellersieck. 1986. Manual of Acute Toxicity: Interpretation and Database for 410 Chemicals and 66 Species of Freshwater Animals. Publication No. 160, United States Fish and Wildlife Service, Washington, DC..

McGill, R., J.W. Tukey and W.A. Larsen. 1978. Variations of Box Plots. *Am. Statistician*, 32(1):12-16.

Montgomery, J.H. 1993. Agrochemicals Desk Reference: Environmental Data. Lewis Publishers. Chelsa, MI.

Novak, C.E. 1985. Preparation of Water-Resources Data Reports. Open File Report, 85-480, U.S. Geological Survey, Washington DC.

SFWMD. 2011. Field Sampling Quality Manual. SFWMD-FIELD-QM-001-07, Effective June 21, 2011. South Florida Water Management District,West Palm Beach, FL.

SFWMD. 2012. Chemistry Laboratory Quality Manual. SFWMD-LAB-QM-2013-01, Effective August 30, 2012. South Florida Water Management District, West Palm Beach, FL.

USEPA. 1991. Pesticide Ecological Effects Database. Ecological Effects Branch, Office of Pesticide Programs, U.S. Environmental Protection Agency, Washington, DC.

USEPA. 1994. Reregistration Eligibility Decision (RED) Hexazinone. EPA 738-R-94-022, U.S. Environmental Protection Agency, Washington, DC. September 1994.

USEPA. 1996. Agency Registration Eligibility Decision Norflurazon List A Case 0229. U.S. Environmental Protection Agency, Washington, DC.

USEPA. 2002. Interim Reregistration Eligibility Decision for Chlorpyrifos. EPA 738-R-01-007, U.S. Environmental Protection Agency, Washington, DC. February 2002.

USEPA. 2003. Reregistration Eligibility Decision (RED) for Diuron. U.S. Environmental Protection Agency, Washington, DC. September 30, 2003.

USEPA. 2006. Decisions Document for Atrazine. U.S. Environmental Protection Agency, Washington, DC.

Verschueren, K. 1983. Handbook of Environmental Data on Organic Chemicals, Second Edition. Van Nostrand Reinhold Co. Inc., New York, NY.

Weaver, K. 2004. Everglades Marsh Dissolved Site-Specific Alternative Criterion Technical Support Document. Water Quality Standards and Special Projects Program, Division of Water Resources Management, Floroda Department of Envirnonmental Protection, Tallahassee, FL.

# Attachment A: Specific Conditions and Cross-References

**Table A-1.** Specific conditions, actions taken, and cross-references presented in this report for the Non-Everglades Construction Project (EFA permit 0237803).

| Specific Condition | Description | Applicable Phase | Action Taken | Reported in the 2014 SFER, App. 3-2 in *(All references are to Volume III, unless noted: "V1" = Volume 1, "V2" = Volume 2)* | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Narrative** (page #s) | **Figure** | **Table** | **Attachment** |
| **1** | Sovereign Lands | Operation | Not Needed | | | | |
| **2** | Historical or Archaeological Artifacts | Operation | Not Needed | | | | |
| **3** | Water Quality Certification | Operation | Not Needed | | | | |
| **4** | New Permit and Permit Modification | Operation | No modification this year | | | | |
| **5** | Non-ECP Annual Reports | Operation | Done annually as required | 1-30 | 1-7 | 1-9 | All |
| **6** | Land Acquisition and Water Treatment Facility Status Updates | Operation | Done every other year as required | V2: Ch. 6A | | | |
| **7** | Data Evaluations | Operation | Not Needed | | | | |
| **8** | Regulatory Action | Operation | Done annually as required | V1: Ch. 4 | | | |
| **9** | Schedule and Strategies | Operation | Not Needed | | | | |
| **10** | Data Quality Assurance | Operation | Done annually as required | 29, SFWMD. 2012. Chemistry Laboratory Quality Manual | | | H |
| **11** | Mercury Screening Program | Operation | Done annually as required | 94-123 | | | G |
| **12(a)** | Permit number | Operation | | 1 | | 1 | |
| **12(b)** | Sampling and analysis dates or code | Operation | | 36 | | | B |
| **12(c)** | Description of methods for collection, handling, storage and analysis of samples | Operation | | 36 | | | B |
| **12(d)** | Map indicating sampling locations | Operation | | 6 and 25 | 1 and 7 | | |
| **12(e)** | Statement by the individual responsible for implementation of sampling program concerning authenticity, precision, detection limits, and accuracy of data and MDL | Operation | | 125-126 | | | H |
| **12(f)** | Documentation that lab performing sampling and analyses has an approved Comprehensive Quality Assurance Plan on file with FDEP | Operation | | 30, SFWMD. 2012. Chemistry Laboratory Quality Manual; SFWMD. 2011, Field Sampling Quality Manual. | | | H |

**Table A-1.** Continued.

| Specific Condition | Description | Applicable Phase | Action Taken | Reported in the 2014 SFER, App. 3-2 in (All references are to Volume III, unless noted: "V1" = Volume 1, "V2" = Volume 2) | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Narrative** (page #s) | **Figure** | **Table** | **Attachment** |
| **12(g)i-iii** | Sampling collection data for each sample taken: i, time of day samples taken; ii average stage or depth of water body; iii depth of sample | Operation | | 36 | | | B |
| **12(g)iv** | Weather conditions at time of sampling | Operation | | 36 | | | B |
| **12(g)v** | Flow period preceding sampling | Operation | | 38 | | | C |
| **12(g)vi** | Monthly flow volumes | Operation | | 42-43 | | D-3 | D |
| **12(h)** | Evaluation of water quality data, including comparison of samples with applicable water quality standards | Operation | | 1-30, 36-93 | 1-7 | 3-10 | D - F |
| **12(i)** | Recommendations for improving water quality monitoring | Operation | No recommendations for this reporting period. | | | | |
| **12(j)** | Recommendations and evaluations regarding implementation of strategies and schedules in the permit, as appropriate | Operation | | V1: Ch. 4 and App. 4-3 | | | |
| **13** | Sampling of Flow Events | Operation | Done annually as required | 23 | | 5 | |
| **14** | Reporting Flow and Non-Flow Samples | Operation | Done annually as required | 23 | | 5 | |
| **15** | Accessibility of Monitoring Sites | Operation | There have been no accessibility issues during this reporting period. | | | | |
| **16** | Monitoring Location Report | Operation | Not needed this year | | | | |
| **17** | Removal of Parameters | Operation | There was no removal of parameters this year | | | | |
| **18** | Additional of Parameters | Operation | There was no addition of parameters this year | | | | |
| **19** | Additional Schedule and Strategies | Operation | Not needed this year | | | | |
| **20** | Emergency Suspension of Sampling | Operation | There was no emergency suspension of sampling this year | | | | |

**Table A-2.** Specific conditions, actions taken, and cross-references presented in this report for the S-197 Structure Replacement Project (ERP permit 0306639-001).

| Specific Condition | Description | Applicable Phase | Action Taken | Reported in the 2014 SFER, App. 3-2 in *(All references are to Volume III, unless noted: "V1" = Volume 1, "V2" = Volume 2)* | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Narrative** (page #s) | **Figure** | **Table** | **Attachment** |
| **1** | Addresses | Operation | Report will be submitted to the Program Coordination and Regulatory Section. | | | | |
| **2** | Threatened and Endangered Species | All | No actions occurred that would result in a take of threatened or endangered species | | | | |
| **3** | Contaminated Sites and Residual Agrichemicals | Construction | No construction this year | | | | |
| **4** | Wetland Impact and Restoration | All | Complied with as required | 3 | | | |
| **5** | Authorized Construction | Construction | No construction this year | 3 | | | |
| **6** | Instructions to Contractors | Construction | No construction this year | | | | |
| **7** | Site Inspections | Construction | No construction this year | | | | |
| **8** | Construction Best Management Practices | Construction | No construction this year | 3 | | | |
| **9** | Adjacent Wetlands | Construction | No construction this year | | | | |
| **10** | Vegetation Removal and Temporary wetland Impacts | Construction | No construction this year | | | | |
| **11** | Water Quality Standards | Construction and Operation | Discussed in this report | 10 | 5 | 3, 4 | E |
| **12** | Dewater | Construction | No construction this year | | | | |
| **13** | Turbidity Monitoring | Construction | No construction this year | | | | |
| **14** | Manatee Protection During Construction | Construction | No construction this year | | | | |
| **15** | NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities | Construction | No construction this year | | | | |
| **16** | NPDES Generic Permit for the Discharge of Produced Ground Water from any Non-Contaminated Site Activity | Construction | No construction this year | | | | |
| **17** | Temporary Operations | Construction | No construction this year | | | | |
| **18** | Temporary Monitoring | Construction | No construction this year | | | | |

**Table A-2.** Continued.

| Specific Condition | Description | Applicable Phase | Action Taken | Reported in the 2014 SFER, App. 3-2 in *(All references are to Volume III, unless noted: "V1" = Volume 1, "V2" = Volume 2)* | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Narrative** (page #s) | **Figure** | **Table** | **Attachment** |
| **19** | Operation and Maintenance | Construction and Operation | Complied with as required | | | | |
| **20** | Water Quality and Flooding Impact | Construction and Operation | Complied with as required | | | | |
| **21** | Factors Outside the Permittee's Control | Construction and Operation | No factors outside our control occurred this year | | | | |
| **22** | Water Quality Monitoring | Operation | Done as required | 4-6 | 3-5 | | E |
| **23** | Construction Status Report | Construction | No construction this year | 3 | | | |
| **24** | As-Built Certification and Record Drawings | Construction | No construction this year | | | | |
| **25** | Annual Report | Operation | This annual report was developed and submitted | | | | |
| **25(A)** | General Information | All | Done as required | 1, 3 | | 1 | |
| **25(B)** | Construction/Operation Summary | Construction and Operation | Done as required | 3 | | | |
| **25(C)** | Water Quality Data | Operation | Done as required | 9-22 | 3-5 | 4, 5, D-2,D-3,E-2, E-3, F-34 | B - F |
| **25(E)** | Implementation Schedule | Operation | Not needed this year | | | | |
| **26** | Permit Renewal | Operation | Not needed this year | | | | |
| **27** | Permit Modification | Operation | No modifications were requested | | | | |
| **28** | Department Review and Approval | Operation | No remediation was needed | | | | |

# Attachment B: Water Quality Data

This project information is required by Specific Conditions 12(b), 12(c), and 12(g) of the Non-ECP permit (0237803), and 25(C) of S-197 Structure Replacement Permit (0306639-001) and is available upon request.

**Table B-1.** Summary of total number of excursions from Florida Class III criteria for all Non-ECP monitoring sites during WY2014 and previous periods.

| Parameter | Total Alkalinity | DO Excursion Rate <10% | Specific Conductance | pH | Turbidity | Un-Ionized Ammonia | Total Iron | Total Cadmium | Total Lead | Total Copper | Total Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EFA Baseline | (1:2677) | (1694:2615) | (59:2615) | (6:2586) | (10:2637) | (12:2548) | (5:836) | (9:362) | (1:364) | (1:373) | (3:363) |
| Non-ECP Baseline | (0:2845) | (2177:3018) | (12:3058) | (37:3008) | (12:2842) | (10:2661) | (5:1655) | (4:785) | (2:785) | (0:779) | (2:786) |
| WY1998 | (0:525) | (459:551) | (3:551) | (12:551) | (0:527) | (7:448) | (0:261) | (1:127) | (0:120) | (0:127) | (0:127) |
| WY1999 | (0:502) | (485:581) | (0:589) | (10:589) | (4:504) | (20:501) | (1:244) | (0:126) | (0:112) | (0:126) | (0:125) |
| WY2000 | (0:559) | (558:697) | (5:698) | (1:698) | (3:645) | (1:622) | (0:270) | (0:133) | (0:119) | (0:132) | (0:129) |
| WY2001 | (0:490) | (455:637) | (2:637) | (1:637) | (1:489) | (3:485) | (1:186) | (0:101) | (0:77) | (0:101) | (0:100) |
| WY2002 | (0:475) | (456:597) | (0:600) | (1:611) | (2:479) | (0:478) | (0:74) | (0:30) | (ND) | (0:29) | (0:25) |
| WY2003 | (1:471) | (436:649) | (1:664) | (2:666) | (1:470) | (0:477) | (0:72) | (0:31) | (ND) | (0:35) | (0:31) |
| WY2004 | (0:506) | (577:793) | (3:761) | (1:812) | (0:519) | (0:522) | (0:70) | (0:31) | (ND) | (0:35) | (0:31) |
| WY2005 | (0:447) | (584:886) | (0:862) | (4:485) | (2:523) | (1:514) | (0:89) | (0:38) | (0:2) | (0:40) | (0:36) |
| WY2006 | (0:443) | (718:905) | (1:907) | (1:919) | (0:569) | (0:562) | (0:74) | (0:32) | (ND) | (0:32) | (0:32) |
| WY2007 | (0:373) | (543:927) | (0:929) | (0:943) | (2:462) | (0:541) | (0:62) | (0:28) | (ND) | (0:28) | (0:44) |
| WY2008 | (0:154) | (510:872) | (0:900) | (2:902) | (3:354) | (0:229) | (0:16) | (ND) | (ND) | (ND) | (ND) |
| WY2009 | (0:2) | (555:871) | (1:882) | (0:882) | (0:317) | (ND) | (ND) | (ND) | (ND) | (ND) | (ND) |
| WY2010 | (ND) | (644:916) | (0:936) | (0:931) | (ND) | (ND) | (0 :11) | (ND) | (ND) | (ND) | (ND) |
| WY2011 | (0:76) | Pass* | (0:879) | (0:871) | (0:318) | (0:112) | (0 :16) | (ND) | (ND) | (ND) | (ND) |
| WY2012 | (0:79) | Pass* | (2:787) | (2:786) | (0:317) | (0:136) | (0 :16) | (ND) | (ND) | (ND) | (ND) |
| WY2013† | (0:99) | (710:936) | (0:952) | (0:952) | (0:344) | (0:160) | (0 :17) | (ND) | (ND) | (ND) | (ND) |
| WY2014† | (0:89) | (23 No:5 Yes) | (0 : 838) | (0 : 836) | (0 : 343) | (0 : 162) | (0 : 16) | (ND) | (ND) | (ND) | (ND) |

WY2014 (May 1, 2013–April 30, 2014) through WY1998 (May 1, 1997–April 30, 1998); Non-ECP Baseline (October 1, 1988–April 30, 1997); and EFA Baseline (October 1, 1978–September 30, 1988). See 2000–2004 Everglades Consolidated Reports and 2005-2011 South Florida Environmental Reports for previous periods (available on the District's website at www.sfwmd.gov/sfer).

*Excursion reporting under the DO limit was adjusted from the fixed 5 mg/L criterion to the Everglades DO SSAC from WY2011 to WY2012 and was adjusted back to 5 mg/L in WY2013 and adjusted with new DO saturation criterion in WY2014.

# Attachment C: Hydrologic Data

This project information is required by Specific Condition 12(g) of the Non-ECP permit (0237803), and 25(C) of S-197 Structure Replacement Permit (0306639-001) and is available upon request.

# Attachment D: Non-Everglades Construction Project/S-197 Structure Replacement Project Water Quality Sampling Sites, Monitoring Schedule, and Flow Volumes

Shi Kui Xue

**Table D-1.** Water quality monitoring schedule for Non-ECP discharge structures and additional upstream monitoring locations.

| Area | Non-ECP Permit Structure | Water Quality Site | Water Quality Monitoring Schedule | | | | | Water Quality Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Physical | Nutrients | Major Ions | Pesticides in Water | Pesticides in Sediment | |
| Into | G-123 | G123 | BWF/M | BWF/M | QTR | QTR | SA | |
| | S-9 | S9 | BWF/M | Weekly Flowing (autosampler) | QTR | QTR | SA | TP collected by autosampler. |
| | S-9A | S9A | BWF/M | BWF/M except TP-WF/M Grab (autosampler) | QTR | | | Sampling started in WY2003 |
| | S-332D | S332DX | WF/M | WF/M | QTR | QTR | SA | |
| | S-18C | S18C | WF/M | WF/M | QTR | QTR | SA | |
| | S-140 | S140 | BWF/M | BWF/M | QTR | QTR | SA | TP collected by autosampler, nitrogen species collected by grab |
| | S-190 | S190 | BWF/M | BWF/M | QTR | QTR | SA | TP collected by autosampler, nitrogen species collected by grab |
| Within | G-64 | G64 | BWF | BWF | QTRF | | | Monitoring Fe, Mg, Ca phased out * |
| | S-346, S-347 | S333 | WF/M | WF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-141 | S34 | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-142 | S142 | BWF/M | BWF/M | QTR | QTR | SA | Monitoring Fe, Mg, Ca phased out * |
| | S-143 | S11A | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-144 | S145 | | | | | | Discontinued sampling in favor of surrogate location at S-145 * |
| | S-145 | S145 | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-146 | S145 | | | | | | Discontinued sampling in favor of surrogate location at S-145 * |
| | S-151 | S151 | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-333 | S333 | WF/M | WF/M | QTR | | | |
| | S-339, S-340 | C123SR84 | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-175 | S175 | BWF | BWF | QTRF | | | |
| | S-332 | S332 | BWF | BWF | QTRF | | | |
| | Berm B3 | BermB3 | BWF/M | BWF/M | QTR | | | |
| From | G-94A, G-94B, G-94C | G94B | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | G-94D | G94D | BWF | BWF | BWF | | | |
| | S-31 | S31 | BWF/M | BWF/M | QTR | QTR | SA | Monitoring Fe, Mg, Ca phased out * |
| | S-34 | S34 | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-38 | S38 | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-39 | S39 | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-197 | S197 | BWF/QTR | BWF/QTR | QTRF | | | Monitoring Fe, Mg, Ca phased out * |
| | S-334 | S356-334 | WF/M | WF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-337 | S31 | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-343A, S-343B | US41-25 | BWF/M | BWF/M | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| | S-344 | S344 | QTR | QTR | QTR | | | Monitoring Fe, Mg, Ca phased out * |
| C-111 Basin | S-176 + | S332DX | | | | | | |
| | S-177 + | S177 | WF/M | WF/M | QTR | QTR | SA | |
| | S-178 + | S178 | WF/M | WF/M | QTR | QTR | SA | |
| | S-331 +, S-173 + | S331-173 | WF/M | WF/M | QTR | QTR | SA | S173 is not listed in Permit, but is adjacent to and flows in same direction as S331 |

Notes:
1) Water quality sample site is located on upstream side of permitted structure, unless otherwise noted with different representative sampling location.
2) Structure names with a "+" are upstream of Non-ECP "into" structures and are additional monitoring locations.
3) * indicates monitoring requirement eliminated in the November 1999 Non-ECP Permit Modification.
4) Table Legend:
BWF/M = Biweekly if Flowing/Otherwise Monthly
BWF = Biweekly if Flowing
QTR = Quarterly
SA = Semiannually
WF/M = Weekly if flow or monthly if not flowing
WF = Weekly if flow
QTRF, Quarterly if Flowing

**Table D-2.** Water quality monitoring schedule for the S-197 Replacement Project discharge structure.

| Parameter | Unit | Sample Type | Sampling Frequency |
|---|---|---|---|
| Turbidity | NTU | G | QTR |
| pH | SU | G | BWF |
| Water Temperature | °C | G | BWF |
| Dissolved Oxygen | Mg/L | G | BWF |
| Conductance | µmhos | G | BWF |
| Total Suspended Solids | mg/L | G | BWF/QTR |
| Nitrogen KJEL | mg/L | G | BWF/QTR |
| Phosphorus Total | mg/L | G | BWF/QTR |
| Nitrite-Nitrate as Nitro. | mg/L | G | BWF/QTR |
| Ortho-phosphorus | mg/L | G | BWF/QTR |
| Sulfate | mg/L | G | QTR |
| Calcium Dissolved | mg/L | G | BWF/QTR |
| Chloride Dissolved | mg/L | G | BWF/QTR |

SU=Standard Units (pH)
°C=Degrees Celsius
mg/L=Milligrams per liter
NTU=Nephelometric turbidity units
µmhos=µ (micro) mhos at 25 °C
G=Grab sample
QTR=Quarterly
BWF=Biweekly if flowing
BWF/QTR=Biweekly if flowing, otherwise quarterly

**Table D-3.** Flow volume, TP loads, and annual flow-weighted mean TP concentrations for Non-ECP structures during WY2014.

| Area | Non-ECP Permit Structure | Water Quality Site | Flow | | Monthly Flow Volumes (ac-ft) (May 1, 2013–April 30, 2014) | | | | | | | | | | | | Total Flow Volume (ac-ft) | Total TP Load (kilogram) | Annual Flow-Weighted Mean TP (ppb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Station | DBKEY | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | | | |
| Into | G-123 | G123 | G123_P | K5481 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N/F |
| | S-9 | S9 | S9_P | K5483 | 6,006 | 19,176 | 38,400 | 2,600 | 5,688 | 2,510 | 8,498 | 2,553 | 831 | 515 | 1,374 | 1,903 | 90,053 | 1,940 | 17 |
| | S-9A | S9A | S-9A_P | TA415 | 8,367 | 7,476 | 7,621 | 6,018 | 13,334 | 6,229 | 7,576 | 7,607 | 6,960 | 6,977 | 4,776 | 3,199 | 86,140 | 1,148 | 11 |
| | S-332D | S-332DX | S-332D_P | TA413 | 937 | 9,948 | 17,883 | 22,371 | 21,993 | 15,278 | 11,285 | 14,081 | 6,142 | 6,298 | 1,381 | 0 | 127,598 | 1,046 | 7 |
| | S-18C | S18C | S18C_S | 15760 | 6,071 | 18,389 | 24,664 | 12,899 | 14,735 | 8,828 | 8,739 | 10,329 | 7,368 | 6,223 | 604 | 175 | 119,024 | 661 | 5 |
| | S-140 | S140 | S140_TOT | 06754 | 5,782 | 20,919 | 26,111 | 14,939 | 18,731 | 9,511 | 1,990 | 2,327 | 1,905 | 3,472 | 2,166 | 550 | 108,403 | 6,235 | 47 |
| | S-190 | S190 | S190_S | K5501 | 0 | 4,822 | 23,928 | 13,869 | 21,017 | 6,022 | 0 | 2 | 82 | 544 | 84 | 0 | 70,369 | 6,607 | 76 |
| Within | G-64 | G64 | G64_C | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | | n/a |
| | S-346, S-347 | S333 | S12D_S | FE774/03638 | 12,119 | 22,899 | 46,308 | 52,508 | 48,910 | 50,023 | 40,443 | 24,325 | 2,840 | 14,239 | 24,530 | 220 | 339,366 | 4,510 | 11 |
| | S-141 | S34 | S141_W | K5493/MC700 | 0 | 0 | 632 | 235 | 166 | 141 | 0 | 0 | 0 | 0 | 0 | 0 | 1,173 | 12 | 8 |
| | S-142 | S142 | S142_C | K5494/F9554/ AI344 | 2 | 172 | 0 | 7 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 198 | 3 | 10 |
| | S-143 | S11A | S143_C | K5495/JM599 | 3,766 | 6,585 | 1,413 | 3,868 | 5,806 | 5,787 | 0 | 8 | 5 | 99 | 814 | 5 | 28,155 | 325 | 9 |
| | S-144 | S145 | S144_C | K5497/VM880 | 1,535 | 7,588 | 3,268 | 0 | 7,011 | 277 | 7,222 | 0 | 4,475 | 6,088 | 1,462 | 0 | 38,928 | 328 | 7 |
| | S-145 | S145 | S145_C | K5498/VM881 | 2,243 | 9,738 | 4,209 | 0 | 7,463 | 299 | 9,267 | 7,406 | 8,048 | 7,324 | 2,124 | 0 | 58,119 | 501 | 7 |
| | S-146 | S145 | S146_C | K5499/VM882 | 298 | 6,668 | 2,620 | 0 | 6,062 | 239 | 6,206 | 2 | 3,266 | 4,289 | 1,262 | 0 | 30,911 | 248 | 7 |
| | S-151 | S151 | S151_C | K5500/JM155 | 21,773 | 31,277 | 36,279 | 37,300 | 27,674 | 13,018 | 0 | 0 | 0 | 0 | 0 | 0 | 167,321 | 2,275 | 11 |
| | S-333 | S333 | S333_S | 15042 | 48,563 | 45,483 | 16,156 | 54,149 | 15,900 | 17,950 | 0 | 0 | 836 | 29,254 | 30,724 | 2,053 | 261,069 | 4,936 | 15 |
| | S-339 | C123SR84 | S339_S | K5506/15563 | 0 | 0 | 9,240 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9,241 | 217 | 19 |
| | S-340 | C123SR84 | S340_S | K5507/15666 | 0 | 0 | 20 | 63 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1 | 12 |
| | S-175 | S175 | S175_C | 15752 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 27 | 0 | 4 | 0 | 0 | 42 | 0 | 9 |
| | S-332 | S332 | S332_P | 15753 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N/F |
| | BERMB3 | BERMB3 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | | n/a |

Notes:
1) Water quality sample site is located on upstream side of permitted structure, unless otherwise noted with different sampling location.
2) n/a indicates that flow and/or stage data are not available, or that structure is not appropriately instrumented to capture information.
3) Structure names with a "+" are upstream of Non-ECP "into" structures and are additional monitoring locations or are listed in Emergency Order Number 9.
4) N/F indicates no positive flow
5) S-331 and S-173 flow records were combined to determine the annual flow-weighted mean TP concentration.

**Table D-3.** Continued.

| Area | Non-ECP Permit Structure | Water Quality Site | Flow | | Monthly Flow Volumes (acre-ft) (May 1, 2013 - April 30, 2014) | | | | | | | | | | | | Total Flow Volume (acre-ft) | Total TP Load (kg) | Annual Flow-Weighted Mean TP (ppb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Station | DBKEY | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | | | |
| From | G-94A | G94B | G94A_C | TA422/VB272 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,429 | 516 | 0 | 0 | 1,946 | 73 | 30 |
| | G-94B | G94B | G94B_C | TA423/V7591 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,583 | 2,583 | 150 | 47 |
| | G-94C | G94B | G94C_C | TA424/OR446 | 216 | 0 | 772 | 3,345 | 0 | 5,837 | 2,576 | 0 | 0 | 0 | 0 | 19 | 12,765 | 453 | 29 |
| | G-94D | G94D | ACME2 | OH648/15023 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N/F |
| | S-31 | S31 | S31_C | K5486/S1494 | 16,750 | 20,332 | 16,505 | 20,236 | 18,423 | 10,343 | 0 | 0 | 22 | 0 | 1 | 0 | 102,612 | 1,483 | 12 |
| | S-34 | S34 | S34_C | K5487/15954 | 4,359 | 6,933 | 5,452 | 8,319 | 8,193 | 8,270 | 0 | 0 | 0 | 137 | 968 | 0 | 42,630 | 567 | 11 |
| | S-38 | S38 | S38_C | K5488/06760 | 24,213 | 28,326 | 28,439 | 35,574 | 34,828 | 26,692 | 7,105 | 7,477 | 6,527 | 8,896 | 12,612 | 6,096 | 226,785 | 2,091 | 7 |
| | S-39 | S39 | S39_S | K5489/06733 | 11,523 | 23,381 | 34,987 | 32,769 | 3,695 | 1,960 | 2,942 | 366 | 265 | 6,179 | 3,037 | 1,502 | 122,605 | 3,478 | 23 |
| | S-197 | S197 | S197_C | 15763 | 0 | 0 | 6,595 | 0 | 0 | 218 | 0 | 0 | 0 | 0 | 0 | 0 | 6,814 | 33 | 4 |
| | S-334 | S356-334 | S334_S | FB752 | 22,197 | 27,273 | 12,613 | 53,142 | 17,427 | 18,648 | 13 | 0 | 0 | 0 | 18 | 1,674 | 153,003 | 2,534 | 13 |
| | S-337 | S31 | S337_C | K5505/SP560 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 7 |
| | S-343A | US41-25 | S343A_C | K5508/16193 | 0 | 0 | 4,784 | 11,172 | 9,307 | 8,226 | 100 | 0 | 0 | 0 | 0 | 0 | 33,588 | 341 | 8 |
| | S-343B | US41-25 | S343B_C | K5509/16196 | 0 | 0 | 7,499 | 15,127 | 13,294 | 12,513 | 168 | 0 | 0 | 0 | 0 | 0 | 48,601 | 496 | 8 |
| | S-344 | S344 | S344_C | K5511/16199 | 0 | 0 | 6,702 | 12,756 | 11,902 | 11,287 | 133 | 0 | 0 | 0 | 0 | 0 | 42,780 | 428 | 8 |
| C-111 Basin | S-176 + | S332DX | S176_S | 15762/12286 | 307 | 364 | 808 | 3 | 80 | 39 | 165 | 323 | 0 | 0 | 0 | 1,103 | 3,192 | 24 | 6 |
| | S-177 + | S177 | S177_S | 15772/13156 | 4,070 | 10,973 | 9,607 | 0 | 8,201 | 859 | 0 | 0 | 0 | 1 | 1 | 826 | 34,539 | 236 | 6 |
| | S-178 + | S178 | S178_C | SO632/PT624 | 174 | 106 | 258 | 0 | 31 | 52 | 16 | 11 | 7 | 0 | 16 | 20 | 690 | 17 | 20 |
| | S-331 + | S331-173 | S331_P | P6935 | 849 | 36,031 | 41,294 | 67,752 | 45,191 | 31,145 | 9,527 | 15,667 | 0 | 0 | 380 | 0 | 247,835 | 2,109 | 7 |
| | S-173 + | S331-173 | S173_C | FB759/P7712 | 3,616 | 85 | 0 | 0 | 0 | 1,480 | 2,338 | 1,122 | 2,697 | 3,093 | 3,630 | 1,384 | 19,444 | 179 | 7 |

Notes:
1) Water quality sample site is located on upstream side of permitted structure, unless otherwise noted with different sampling location.
2) n/a indicates that flow and/or stage data are not available, or that structure is not appropriately instrumented to capture information.
3) Structure names with a "+" are upstream of Non-ECP "into" structures and are additional monitoring locations or are listed in Emergency Order Number 9.
4) N/F indicates no positive flow
5) S-331 and S-173 flow records were combined to determine the annual flow-weighted mean TP concentration.

# Attachment E: Summary Statistics of Non-Everglades Construction Project Water Quality Monitoring Data for Water Year 2014

Shi Kui Xue and Steven Hill

**Table E-1.** Summary of total number of excursions from state Class III criteria for all Non-ECP monitoring sites during WY2014 and previous periods. Florida Class III Fresh Surface Water Criteria (Section 62-302.530, F.A.C.) for parameters monitored for the project are provided in **Table 3**.

| Parameter | Total Alkalinity | DO Excursion Rate <10% | Specific Conductance | pH | Turbidity | Un-Ionized Ammonia | Total Iron | Total Cadmium | Total Lead | Total Copper | Total Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EFA Baseline | (1:2677) | (1694:2615) | (59:2615) | (6:2586) | (10:2637) | (12:2548) | (5:836) | (9:362) | (1:364) | (1:373) | (3:363) |
| Non-ECP Baseline | (0:2845) | (2177:3018) | (12:3058) | (37:3008) | (12:2842) | (10:2661) | (5:1655) | (4:785) | (2:785) | (0:779) | (2:786) |
| WY1998 | (0:525) | (459:551) | (3:551) | (12:551) | (0:527) | (7:448) | (0:261) | (1:127) | (0:120) | (0:127) | (0:127) |
| WY1999 | (0:502) | (485:581) | (0:589) | (10:589) | (4:504) | (20:501) | (1:244) | (0:126) | (0:112) | (0:126) | (0:125) |
| WY2000 | (0:559) | (558:697) | (5:698) | (1:698) | (3:645) | (1:622) | (0:270) | (0:133) | (0:119) | (0:132) | (0:129) |
| WY2001 | (0:490) | (455:637) | (2:637) | (1:637) | (1:489) | (3:485) | (1:186) | (0:101) | (0:77) | (0:101) | (0:100) |
| WY2002 | (0:475) | (456:597) | (0:600) | (1:611) | (2:479) | (0:478) | (0:74) | (0:30) | (ND) | (0:29) | (0:25) |
| WY2003 | (1:471) | (436:649) | (1:664) | (2:666) | (1:470) | (0:477) | (0:72) | (0:31) | (ND) | (0:35) | (0:31) |
| WY2004 | (0:506) | (577:793) | (3:761) | (1:812) | (0:519) | (0:522) | (0:70) | (0:31) | (ND) | (0:35) | (0:31) |
| WY2005 | (0:447) | (584:886) | (0:862) | (4:485) | (2:523) | (1:514) | (0:89) | (0:38) | (0:2) | (0:40) | (0:36) |
| WY2006 | (0:443) | (718:905) | (1:907) | (1:919) | (0:569) | (0:562) | (0:74) | (0:32) | (ND) | (0:32) | (0:32) |
| WY2007 | (0:373) | (543:927) | (0:929) | (0:943) | (2:462) | (0:541) | (0:62) | (0:28) | (ND) | (0:28) | (0:44) |
| WY2008 | (0:154) | (510:872) | (0:900) | (2:902) | (3:354) | (0:229) | (0:16) | (ND) | (ND) | (ND) | (ND) |
| WY2009 | (0:2) | (555:871) | (1:882) | (0:882) | (0:317) | (ND) | (ND) | (ND) | (ND) | (ND) | (ND) |
| WY2010 | (ND) | (644:916) | (0:936) | (0:931) | (ND) | (ND) | (0 :11) | (ND) | (ND) | (ND) | (ND) |
| WY2011 | (0:76) | Pass* | (0:879) | (0:871) | (0:318) | (0:112) | (0 :16) | (ND) | (ND) | (ND) | (ND) |
| WY2012 | (0:79) | Pass* | (2:787) | (2:786) | (0:317) | (0:136) | (0 :16) | (ND) | (ND) | (ND) | (ND) |
| WY2013† | (0:99) | (710:936) | (0:952) | (0:952) | (0:344) | (0:160) | (0 :17) | (ND) | (ND) | (ND) | (ND) |
| WY2014† | (0:89) | (23 No:5 Yes) | (0 : 838) | (0 : 836) | (0 : 343) | (0 : 162) | (0 : 16) | (ND) | (ND) | (ND) | (ND) |

WY2014 (May 1, 2013–April 30, 2014) through WY1998 (May 1, 1997–April 30, 1998); Non-ECP Baseline (October 1, 1988–April 30, 1997); and EFA Baseline (October 1, 1978–September 30, 1988). See 2000–2004 Everglades Consolidated Reports and 2005-2011 South Florida Environmental Reports for previous periods (available on the District's website at www.sfwmd.gov/sfer).

*Excursion reporting under the DO limit was adjusted from the fixed 5 mg/L criterion to the Everglades DO SSAC from WY2011 to WY2012 and was adjusted back to 5 mg/L in WY2013 and adjusted with new DO saturation criterion in WY2014.

**Table E-2.** Cross-reference for the four Non-ECP discharge structure categories, and their associated discharge structures and water quality monitoring sites. This information corresponds to the data summary statistics shown in **Table E-3**. Non-ECP structure locations are shown in **Figure 1** of the report.

| Discharge Structure Category | Non-ECP Discharge Structure | Associated Water Quality Monitoring Site | Comments |
|---|---|---|---|
| Into | G-123 | G123 | Autosampler installed upstream of pump station during WY2001 |
| | S-9 | S9 | Autosampler installed upstream of pump station during WY2000 |
| | S-9A | S9A | Water quality data available in WY2003 |
| | S-332D | S-332DX | The site is a new Non-ECP structure |
| | S-18C | S18C | Autosampler installed upstream of pump station during WY2003 |
| | S-140 | S140 | Autosampler installed upstream of pump station during WY2001 |
| | S-190 | S190 | Autosampler installed upstream of pump station during WY2001 |
| Within | G-64 | G64 | |
| | S-346, S-347 | S12D | |
| | S-141 | S34 | |
| | S-142 | S142 | |
| | S-143 | S11A | |
| | S-144 | S145 | |
| | S-145 | S145 | |
| | S-146 | S145 | |
| | S-151 | S151 | |
| | S-333 | S333 | |
| | S-339, S-340 | C123SR84 | |
| | S-175 | S175 | |
| | S-332 | S332 | |
| | Burm-B3 | BurmB3 | |
| From | G-94A, G-94B, G-94C | G94B | |
| | G-94D | G94D | |
| | S-31, S-337 | S31 | |
| | S-34 | S34 | |
| | S-38 | S38 | |
| | S-39 | S39 | |
| | S-197 | S197 | |
| | S-334 | S356-334 | |
| | S-343A, S-343B | US41-25 | |
| | S-344 | S344 | |
| C-111 Basin | S-176 + | S332DX | |
| | S-177 + | S177 | |
| | S-178 + | S178 | |
| | S-331 +, S-173 + | S331-173 | |

Notes:

1) Water quality sample site is located on upstream side of permitted structure; unless otherwise noted with different representative sampling location.

2) Structure names with a "+" are upstream of Non-ECP Into structures and are additional monitoring locations.

**Table E-3.** Summary statistics and excursions of Non-ECP water quality monitoring data (physical parameters, nutrients, major ions, and trace metals) collected during WY2014. [Note: DO mean, standard deviation, minimum, Q25, median, Q75, and maximum values are reported in mg/L. Excursions were determined based on % DO saturation calculations provided in Attachment B.]

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G123 | DO | mg/L | 8 | 14MAY2013 - 15APR2014 | 12 | 3.674 | 0.888 | 2.13 | 3.17 | 3.765 | 4.425 | 4.85 | 0 | 2 | 16.7% |
| G123 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 15APR2014 | 12 | 771.500 | 59.146 | 666.7 | 738 | 764 | 796.5 | 897 | 0 | 0 | 0.0% |
| G123 | PH | UNITS | 10 | 14MAY2013 - 15APR2014 | 12 | 7.392 | 0.168 | 7.1 | 7.25 | 7.45 | 7.5 | 7.6 | 0 | 0 | 0.0% |
| G123 | TURBIDITY | NTU | 12 | 14MAY2013 - 15APR2014 | 14 | 1.986 | 1.762 | 0.7 | 1.1 | 1.55 | 1.9 | 7.7 | 0 | 0 | 0.0% |
| G123 | HARDNESS | mg/L CACO3 | 35 | 09JUL2013 - 15APR2014 | 4 | 234.400 | 27.572 | 206.9 | 214.45 | 229.7 | 254.35 | 271.3 | 0 | 0 | 0.0% |
| G123 | TEMP | CENT | 7 | 14MAY2013 - 15APR2014 | 12 | 25.867 | 2.512 | 21.4 | 23.7 | 26.35 | 27.9 | 29.3 | 0 | 0 | 0.0% |
| G123 | TN | mg N/L | 80 | 14MAY2013 - 15APR2014 | 12 | 1.558 | 0.164 | 1.31 | 1.415 | 1.5775 | 1.6625 | 1.855 | 0 | 0 | 0.0% |
| G123 | NOX | mg N/L | 18;180 | 14MAY2013 - 15APR2014 | 12 | 0.009 | 0.008 | 0.005 | 0.005 | 0.005 | 0.009 | 0.027 | 0 | 0 | 0.0% |
| G123 | TKN | mg N/L | 21 | 14MAY2013 - 15APR2014 | 12 | 1.552 | 0.163 | 1.31 | 1.415 | 1.565 | 1.65 | 1.85 | 0 | 0 | 0.0% |
| G123 | OPO4 | mg P/L | 23 | 14MAY2013 - 15APR2014 | 12 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 | 0 | 0 | 0.0% |
| G123 | TP | mg P/L | 25 | 14MAY2013 - 15APR2014 | 12 | 0.016 | 0.013 | 0.007 | 0.009 | 0.0105 | 0.018 | 0.056 | 0 | 0 | 0.0% |
| G123 | DIS. CA | mg/L | 30 | 09JUL2013 - 15APR2014 | 4 | 64.975 | 13.370 | 52.2 | 54.05 | 63.35 | 75.9 | 81 | 0 | 0 | 0.0% |
| G123 | DIS. K | mg/L | 29 | 09JUL2013 - 15APR2014 | 4 | 4.825 | 1.531 | 3.3 | 3.6 | 4.65 | 6.05 | 6.7 | 0 | 0 | 0.0% |
| G123 | DIS. MG | mg/L | 31 | 09JUL2013 - 15APR2014 | 4 | 17.500 | 3.315 | 14.7 | 15.5 | 16.5 | 19.5 | 22.3 | 0 | 0 | 0.0% |
| G123 | DIS. NA | mg/L | 28 | 09JUL2013 - 15APR2014 | 4 | 59.775 | 8.953 | 49.7 | 52.8 | 59.5 | 66.75 | 70.4 | 0 | 0 | 0.0% |
| G123 | TOT. CL | mg/L | 32 | 09JUL2013 - 15APR2014 | 6 | 58.983 | 45.266 | 1.6 | 1.8 | 78 | 93.5 | 101 | 0 | 0 | 0.0% |
| G123 | TOT. SO4 | mg/L | 33 | 09JUL2013 - 15APR2014 | 4 | 15.225 | 16.714 | 0.7 | 0.75 | 15.25 | 29.7 | 29.7 | 0 | 0 | 0.0% |
| G123 | CA_I | mg/L | 188 | 18SEP2013 - 29JAN2014 | 2 | 3.035 | 4.052 | 0.17 | 0.17 | 3.035 | 5.9 | 5.9 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S9 | DO | mg/L | 8 | 06MAY2013 - 28APR2014 | 51 | 2.779 | 1.313 | 0.4 | 1.64 | 2.72 | 3.85 | 5.02 | 0 | 29 | 56.9% |
| S9 | FLDCOND. | UMHOS/CM | 9 | 06MAY2013 - 28APR2014 | 52 | 748.671 | 61.182 | 537.1 | 734.3 | 769.5 | 787 | 809 | 0 | 0 | 0.0% |
| S9 | PH | UNITS | 10 | 06MAY2013 - 28APR2014 | 52 | 7.323 | 0.162 | 7 | 7.2 | 7.3 | 7.4 | 7.8 | 0 | 0 | 0.0% |
| S9 | TURBIDITY | NTU | 12 | 13MAY2013 - 14APR2014 | 17 | 3.112 | 2.160 | 1.5 | 1.8 | 2.1 | 3.3 | 9 | 0 | 0 | 0.0% |
| S9 | HARDNESS | mg/L CACO3 | 35 | 08JUL2013 - 14APR2014 | 4 | 264.450 | 8.095 | 255.5 | 258.6 | 263.75 | 270.3 | 274.8 | 0 | 0 | 0.0% |
| S9 | TEMP | CENT | 7 | 06MAY2013 - 28APR2014 | 52 | 25.702 | 1.948 | 21.1 | 24 | 26.05 | 27.3 | 29.1 | 0 | 0 | 0.0% |
| S9 | TN | mg N/L | 80 | 13MAY2013 - 14APR2014 | 15 | 1.491 | 0.110 | 1.25 | 1.44 | 1.519 | 1.557 | 1.673 | 0 | 0 | 0.0% |
| S9 | NOX | mg N/L | 18;180 | 13MAY2013 - 14APR2014 | 13 | 0.047 | 0.035 | 0.015 | 0.018 | 0.032 | 0.069 | 0.13 | 0 | 0 | 0.0% |
| S9 | TKN | mg N/L | 21 | 13MAY2013 - 14APR2014 | 15 | 1.451 | 0.133 | 1.12 | 1.44 | 1.49 | 1.53 | 1.62 | 0 | 0 | 0.0% |
| S9 | OPO4 | mg P/L | 23 | 13MAY2013 - 14APR2014 | 15 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S9 | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 52 | 0.010 | 0.004 | 0.007 | 0.008 | 0.009 | 0.01 | 0.024 | 0 | 0 | 0.0% |
| S9 | DIS. CA | mg/L | 30 | 08JUL2013 - 14APR2014 | 4 | 80.350 | 3.135 | 77.2 | 77.9 | 79.95 | 82.8 | 84.3 | 0 | 0 | 0.0% |
| S9 | DIS. K | mg/L | 29 | 08JUL2013 - 14APR2014 | 4 | 3.875 | 0.222 | 3.6 | 3.7 | 3.9 | 4.05 | 4.1 | 0 | 0 | 0.0% |
| S9 | DIS. MG | mg/L | 31 | 08JUL2013 - 14APR2014 | 4 | 15.500 | 0.316 | 15.2 | 15.25 | 15.45 | 15.75 | 15.9 | 0 | 0 | 0.0% |
| S9 | DIS. NA | mg/L | 28 | 08JUL2013 - 14APR2014 | 4 | 56.900 | 2.273 | 53.9 | 55.4 | 57.15 | 58.4 | 59.4 | 0 | 0 | 0.0% |
| S9 | TOT. CL | mg/L | 32 | 08JUL2013 - 14APR2014 | 6 | 59.800 | 41.896 | 4 | 7.7 | 83.85 | 88.4 | 91 | 0 | 0 | 0.0% |
| S9 | TOT. SO4 | mg/L | 33 | 08JUL2013 - 14APR2014 | 4 | 2.050 | 0.551 | 1.5 | 1.6 | 2 | 2.5 | 2.7 | 0 | 0 | 0.0% |
| S9 | CA_I | mg/L | 188 | 19SEP2013 - 30JAN2014 | 2 | 2.500 | 1.838 | 1.2 | 1.2 | 2.5 | 3.8 | 3.8 | 0 | 0 | 0.0% |
| S9Auto | TN | mg N/L | 80 | 06MAY2013 - 21APR2014 | 26 | 1.440 | 0.108 | 1.257 | 1.35 | 1.4485 | 1.509 | 1.637 | 0 | 0 | 0.0% |
| S9Auto | NOX | mg N/L | 18;180 | 06MAY2013 - 21APR2014 | 22 | 0.056 | 0.035 | 0.014 | 0.026 | 0.044 | 0.08 | 0.137 | 0 | 0 | 0.0% |
| S9Auto | TKN | mg N/L | 21 | 06MAY2013 - 21APR2014 | 26 | 1.392 | 0.121 | 1.19 | 1.33 | 1.39 | 1.48 | 1.6 | 0 | 0 | 0.0% |
| S9Auto | TP | mg P/L | 25 | 06MAY2013 - 21APR2014 | 27 | 0.012 | 0.005 | 0.007 | 0.008 | 0.012 | 0.015 | 0.024 | 0 | 0 | 0.0% |
| S9A | DO | mg/L | 8 | 06MAY2013 - 28APR2014 | 51 | 2.731 | 1.605 | 0.35 | 1.33 | 2.48 | 3.94 | 8.26 | 0 | 32 | 62.7% |
| S9A | FLDCOND. | UMHOS/CM | 9 | 06MAY2013 - 28APR2014 | 52 | 751.775 | 53.964 | 592 | 733.5 | 769.5 | 784 | 819 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S9A | PH | UNITS | 10 | 06MAY2013 - 28APR2014 | 52 | 7.338 | 0.168 | 7 | 7.2 | 7.3 | 7.4 | 7.8 | 0 | 0 | 0.0% |
| S9A | TURBIDITY | NTU | 12 | 13MAY2013 - 28APR2014 | 18 | 2.083 | 0.514 | 1.3 | 1.8 | 2.05 | 2.2 | 3.6 | 0 | 0 | 0.0% |
| S9A | HARDNESS | mg/L CACO3 | 35 | 08JUL2013 - 14APR2014 | 4 | 265.425 | 10.092 | 252.4 | 258.4 | 266.3 | 272.45 | 276.7 | 0 | 0 | 0.0% |
| S9A | TEMP | CENT | 7 | 06MAY2013 - 28APR2014 | 52 | 25.660 | 1.855 | 21.5 | 24.25 | 26 | 27.05 | 29 | 0 | 0 | 0.0% |
| S9A | TN | mg N/L | 80 | 13MAY2013 - 28APR2014 | 18 | 1.508 | 0.096 | 1.258 | 1.47 | 1.5285 | 1.582 | 1.65 | 0 | 0 | 0.0% |
| S9A | NOX | mg N/L | 18;180 | 13MAY2013 - 28APR2014 | 16 | 0.029 | 0.019 | 0.008 | 0.0195 | 0.0235 | 0.0305 | 0.083 | 0 | 0 | 0.0% |
| S9A | TKN | mg N/L | 21 | 13MAY2013 - 28APR2014 | 18 | 1.483 | 0.103 | 1.23 | 1.46 | 1.505 | 1.55 | 1.64 | 0 | 0 | 0.0% |
| S9A | OPO4 | mg P/L | 23 | 13MAY2013 - 28APR2014 | 18 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S9A | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 52 | 0.011 | 0.003 | 0.007 | 0.009 | 0.01 | 0.011 | 0.024 | 0 | 0 | 0.0% |
| S9A | DIS. CA | mg/L | 30 | 08JUL2013 - 14APR2014 | 4 | 80.150 | 3.178 | 76.1 | 77.8 | 80.45 | 82.5 | 83.6 | 0 | 0 | 0.0% |
| S9A | DIS. K | mg/L | 29 | 08JUL2013 - 14APR2014 | 4 | 3.950 | 0.238 | 3.6 | 3.8 | 4.05 | 4.1 | 4.1 | 0 | 0 | 0.0% |
| S9A | DIS. MG | mg/L | 31 | 08JUL2013 - 14APR2014 | 4 | 15.850 | 0.545 | 15.2 | 15.45 | 15.85 | 16.25 | 16.5 | 0 | 0 | 0.0% |
| S9A | DIS. NA | mg/L | 28 | 08JUL2013 - 14APR2014 | 4 | 57.550 | 2.849 | 53.6 | 55.8 | 58.1 | 59.3 | 60.4 | 0 | 0 | 0.0% |
| S9A | TOT. CL | mg/L | 32 | 08JUL2013 - 14APR2014 | 4 | 87.350 | 4.435 | 83.1 | 83.65 | 86.95 | 91.05 | 92.4 | 0 | 0 | 0.0% |
| S9A | TOT. SO4 | mg/L | 33 | 08JUL2013 - 14APR2014 | 4 | 2.075 | 0.670 | 1.4 | 1.5 | 2.1 | 2.65 | 2.7 | 0 | 0 | 0.0% |
| S9AAuto | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 52 | 0.011 | 0.003 | 0.008 | 0.009 | 0.01 | 0.011 | 0.022 | 0 | 0 | 0.0% |
| S18C | DO | mg/L | 8 | 07MAY2013 - 29APR2014 | 52 | 5.210 | 1.968 | 1.23 | 3.795 | 5.145 | 6.635 | 8.64 | 0 | 11 | 21.2% |
| S18C | FLDCOND. | UMHOS/CM | 9 | 07MAY2013 - 29APR2014 | 52 | 517.827 | 15.316 | 473 | 514.5 | 521.5 | 528 | 537 | 0 | 0 | 0.0% |
| S18C | PH | UNITS | 10 | 07MAY2013 - 29APR2014 | 52 | 7.560 | 0.286 | 7 | 7.4 | 7.5 | 7.7 | 8.2 | 0 | 0 | 0.0% |
| S18C | TURBIDITY | NTU | 12 | 14MAY2013 - 14APR2014 | 7 | 4.243 | 5.708 | 0.8 | 0.8 | 1 | 11 | 14 | 0 | 0 | 0.0% |
| S18C | TSS | mg/L | 16 | 07MAY2013 - 22APR2014 | 45 | 3.000 | 0.000 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.0% |
| S18C | HARDNESS | mg/L CACO3 | 35 | 07MAY2013 - 22APR2014 | 45 | 202.207 | 9.700 | 177.9 | 197.2 | 203.6 | 208.5 | 225 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S18C | TEMP | CENT | 7 | 07MAY2013 - 29APR2014 | 52 | 26.119 | 1.735 | 21.6 | 25.05 | 26.1 | 27.5 | 28.9 | 0 | 0 | 0.0% |
| S18C | TN | mg N/L | 80 | 07MAY2013 - 22APR2014 | 45 | 0.576 | 0.064 | 0.41 | 0.543 | 0.57 | 0.626 | 0.699 | 0 | 0 | 0.0% |
| S18C | NOX | mg N/L | 18;180 | 07MAY2013 - 22APR2014 | 44 | 0.089 | 0.056 | 0.005 | 0.051 | 0.076 | 0.1235 | 0.21 | 0 | 0 | 0.0% |
| S18C | TKN | mg N/L | 21 | 07MAY2013 - 22APR2014 | 43 | 0.490 | 0.053 | 0.38 | 0.46 | 0.49 | 0.52 | 0.61 | 0 | 0 | 0.0% |
| S18C | OPO4 | mg P/L | 23 | 07MAY2013 - 22APR2014 | 45 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S18C | TP | mg P/L | 25 | 07MAY2013 - 29APR2014 | 52 | 0.004 | 0.001 | 0.002 | 0.003 | 0.004 | 0.004 | 0.007 | 0 | 0 | 0.0% |
| S18C | DIS. CA | mg/L | 30 | 07MAY2013 - 22APR2014 | 45 | 72.071 | 4.405 | 61.6 | 69 | 73.2 | 74.8 | 82 | 0 | 0 | 0.0% |
| S18C | DIS. K | mg/L | 29 | 07MAY2013 - 22APR2014 | 45 | 4.496 | 0.881 | 3.2 | 3.8 | 4.2 | 4.8 | 7 | 0 | 0 | 0.0% |
| S18C | DIS. MG | mg/L | 31 | 07MAY2013 - 22APR2014 | 45 | 5.393 | 0.640 | 4.4 | 4.9 | 5.2 | 5.9 | 6.6 | 0 | 0 | 0.0% |
| S18C | DIS. NA | mg/L | 28 | 07MAY2013 - 22APR2014 | 45 | 26.042 | 2.119 | 20.2 | 24.2 | 26.4 | 27.7 | 29.4 | 0 | 0 | 0.0% |
| S18C | TOT. CL | mg/L | 32 | 07MAY2013 - 22APR2014 | 47 | 39.930 | 6.934 | 10 | 38.4 | 41.1 | 43.5 | 47.3 | 0 | 0 | 0.0% |
| S18C | TOT. SO4 | mg/L | 33 | 14MAY2013 - 14APR2014 | 5 | 6.700 | 1.490 | 4.3 | 6.5 | 7.1 | 7.3 | 8.3 | 0 | 0 | 0.0% |
| S18C | CA_I | mg/L | 188 | 16SEP2013 - 27JAN2014 | 2 | 2.155 | 2.609 | 0.31 | 0.31 | 2.155 | 4 | 4 | 0 | 0 | 0.0% |
| S18CAuto | TN | mg N/L | 80 | 07MAY2013 - 22APR2014 | 38 | 0.599 | 0.078 | 0.484 | 0.55 | 0.59 | 0.626 | 0.943 | 0 | 0 | 0.0% |
| S18CAuto | NOX | mg N/L | 18;180 | 07MAY2013 - 22APR2014 | 38 | 0.085 | 0.038 | 0.005 | 0.055 | 0.087 | 0.103 | 0.163 | 0 | 0 | 0.0% |
| S18CAuto | TKN | mg N/L | 21 | 07MAY2013 - 22APR2014 | 37 | 0.516 | 0.083 | 0.39 | 0.47 | 0.5 | 0.55 | 0.89 | 0 | 0 | 0.0% |
| S18CAuto | TP | mg P/L | 25 | 07MAY2013 - 22APR2014 | 38 | 0.005 | 0.002 | 0.003 | 0.003 | 0.004 | 0.005 | 0.012 | 0 | 0 | 0.0% |
| S140 | DO | mg/L | 8 | 07MAY2013 - 29APR2014 | 50 | 4.117 | 1.898 | 0.96 | 2.07 | 4.325 | 5.31 | 8.88 | 0 | 17 | 34.0% |
| S140 | FLDCOND. | UMHOS/CM | 9 | 07MAY2013 - 29APR2014 | 52 | 581.669 | 107.127 | 407.7 | 482.4 | 579.5 | 698.6 | 731.4 | 0 | 0 | 0.0% |
| S140 | TURBIDITY | NTU | 12 | 14MAY2013 - 15APR2014 | 23 | 1.470 | 0.631 | 0.6 | 1.2 | 1.3 | 1.6 | 3.3 | 0 | 0 | 0.0% |
| S140 | HARDNESS | mg/L CACO3 | 35 | 09JUL2013 - 15APR2014 | 4 | 208.100 | 50.084 | 163.8 | 165.15 | 204.55 | 251.05 | 259.5 | 0 | 0 | 0.0% |
| S140 | TEMP | CENT | 7 | 07MAY2013 - 29APR2014 | 52 | 25.783 | 2.856 | 18.5 | 23.5 | 26.35 | 28.4 | 29.9 | 0 | 0 | 0.0% |
| S140 | TN | mg N/L | 80 | 14MAY2013 - 15APR2014 | 21 | 1.221 | 0.104 | 0.927 | 1.153 | 1.225 | 1.281 | 1.396 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S140 | PH | UNITS | 10 | 07MAY2013 - 29APR2014 | 52 | 7.450 | 0.315 | 7 | 7.2 | 7.45 | 7.7 | 8.3 | 0 | 0 | 0.0% |
| S140 | TKN | mg N/L | 21 | 14MAY2013 - 15APR2014 | 21 | 1.178 | 0.107 | 0.91 | 1.11 | 1.17 | 1.25 | 1.37 | 0 | 0 | 0.0% |
| S140 | OPO4 | mg P/L | 23 | 14MAY2013 - 15APR2014 | 21 | 0.016 | 0.013 | 0.002 | 0.008 | 0.013 | 0.019 | 0.052 | 0 | 0 | 0.0% |
| S140 | TP | mg P/L | 25 | 07MAY2013 - 29APR2014 | 52 | 0.041 | 0.013 | 0.019 | 0.032 | 0.037 | 0.0475 | 0.084 | 0 | 0 | 0.0% |
| S140 | DIS. CA | mg/L | 30 | 09JUL2013 - 15APR2014 | 4 | 72.975 | 15.937 | 58.1 | 59.3 | 72.4 | 86.65 | 89 | 0 | 0 | 0.0% |
| S140 | DIS. K | mg/L | 29 | 09JUL2013 - 15APR2014 | 4 | 4.425 | 1.735 | 2.2 | 3.05 | 4.8 | 5.8 | 5.9 | 0 | 0 | 0.0% |
| S140 | DIS. MG | mg/L | 31 | 09JUL2013 - 15APR2014 | 4 | 6.275 | 2.529 | 3.7 | 4.15 | 6.2 | 8.4 | 9 | 0 | 0 | 0.0% |
| S140 | DIS. NA | mg/L | 28 | 09JUL2013 - 15APR2014 | 4 | 38.675 | 21.181 | 15.9 | 20.8 | 39.55 | 56.55 | 59.7 | 0 | 0 | 0.0% |
| S140 | TOT. CL | mg/L | 32 | 09JUL2013 - 15APR2014 | 6 | 36.717 | 34.976 | 1.4 | 2.8 | 29.7 | 75.5 | 81.2 | 0 | 0 | 0.0% |
| S140 | TOT. SO4 | mg/L | 33 | 09JUL2013 - 15APR2014 | 4 | 10.775 | 6.832 | 3.3 | 5 | 11.3 | 16.55 | 17.2 | 0 | 0 | 0.0% |
| S140 | CA_I | mg/L | 188 | 18SEP2013 - 29JAN2014 | 2 | 0.510 | 0.170 | 0.39 | 0.39 | 0.51 | 0.63 | 0.63 | 0 | 0 | 0.0% |
| S140Auto | TP | mg P/L | 25 | 07MAY2013 - 22APR2014 | 50 | 0.048 | 0.014 | 0.027 | 0.037 | 0.044 | 0.058 | 0.088 | 0 | 0 | 0.0% |
| S175 | DO | mg/L | 8 | 25FEB2014 - 25FEB2014 | 1 | 3.390 | | 3.39 | 3.39 | 3.39 | 3.39 | 3.39 | 0 | 1 | 100.0% |
| S175 | FLDCOND. | UMHOS/CM | 9 | 25FEB2014 - 25FEB2014 | 1 | 533.000 | | 533 | 533 | 533 | 533 | 533 | 0 | 0 | 0.0% |
| S175 | PH | UNITS | 10 | 25FEB2014 - 25FEB2014 | 1 | 7.400 | | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 0 | 0 | 0.0% |
| S175 | TSS | mg/L | 16 | 25FEB2014 - 25FEB2014 | 1 | 3.000 | | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.0% |
| S175 | HARDNESS | mg/L CACO3 | 35 | 25FEB2014 - 25FEB2014 | 1 | 212.900 | | 212.9 | 212.9 | 212.9 | 212.9 | 212.9 | 0 | 0 | 0.0% |
| S175 | TEMP | CENT | 7 | 25FEB2014 - 25FEB2014 | 1 | 26.300 | | 26.3 | 26.3 | 26.3 | 26.3 | 26.3 | 0 | 0 | 0.0% |
| S175 | TN | mg N/L | 80 | 25FEB2014 - 25FEB2014 | 1 | 0.634 | | 0.634 | 0.634 | 0.634 | 0.634 | 0.634 | 0 | 0 | 0.0% |
| S175 | NOX | mg N/L | 18;180 | 25FEB2014 - 25FEB2014 | 1 | 0.034 | | 0.034 | 0.034 | 0.034 | 0.034 | 0.034 | 0 | 0 | 0.0% |
| S175 | TKN | mg N/L | 21 | 25FEB2014 - 25FEB2014 | 1 | 0.600 | | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0 | 0 | 0.0% |
| S175 | OPO4 | mg P/L | 23 | 25FEB2014 - 25FEB2014 | 1 | 0.002 | | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S175 | TP | mg P/L | 25 | 25FEB2014 - 25FEB2014 | 1 | 0.009 | | 0.009 | 0.009 | 0.009 | 0.009 | 0.009 | 0 | 0 | 0.0% |
| S175 | DIS. CA | mg/L | 30 | 25FEB2014 - 25FEB2014 | 1 | 76.700 | | 76.7 | 76.7 | 76.7 | 76.7 | 76.7 | 0 | 0 | 0.0% |
| S175 | DIS. K | mg/L | 29 | 25FEB2014 - 25FEB2014 | 1 | 1.400 | | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 0 | 0 | 0.0% |
| S175 | DIS. MG | mg/L | 31 | 25FEB2014 - 25FEB2014 | 1 | 5.200 | | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 0 | 0 | 0.0% |
| S175 | DIS. NA | mg/L | 28 | 25FEB2014 - 25FEB2014 | 1 | 25.500 | | 25.5 | 25.5 | 25.5 | 25.5 | 25.5 | 0 | 0 | 0.0% |
| S175 | TOT. CL | mg/L | 32 | 25FEB2014 - 25FEB2014 | 1 | 40.300 | | 40.3 | 40.3 | 40.3 | 40.3 | 40.3 | 0 | 0 | 0.0% |
| S175 | TOT. SO4 | mg/L | 33 | 25FEB2014 - 25FEB2014 | 1 | 0.200 | | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0 | 0 | 0.0% |
| S190 | DO | mg/L | 8 | 07MAY2013 - 29APR2014 | 51 | 5.615 | 2.153 | 1.53 | 4.04 | 5.96 | 7.27 | 9.54 | 0 | 7 | 13.7% |
| S190 | FLDCOND. | UMHOS/CM | 9 | 07MAY2013 - 29APR2014 | 51 | 516.267 | 78.053 | 342 | 463 | 553 | 581 | 630 | 0 | 0 | 0.0% |
| S190 | PH | UNITS | 10 | 07MAY2013 - 29APR2014 | 50 | 7.618 | 0.365 | 7 | 7.3 | 7.65 | 7.9 | 8.2 | 0 | 0 | 0.0% |
| S190 | TURBIDITY | NTU | 12 | 07MAY2013 - 22APR2014 | 22 | 2.886 | 2.768 | 0.8 | 1.4 | 2 | 2.9 | 13 | 0 | 0 | 0.0% |
| S190 | HARDNESS | mg/L CACO3 | 35 | 16JUL2013 - 08APR2014 | 4 | 210.650 | 32.457 | 167 | 186.25 | 218.1 | 235.05 | 239.4 | 0 | 0 | 0.0% |
| S190 | TEMP | CENT | 7 | 07MAY2013 - 29APR2014 | 52 | 25.906 | 3.160 | 18.9 | 23.35 | 26.75 | 28.55 | 30.9 | 0 | 0 | 0.0% |
| S190 | TN | mg N/L | 80 | 07MAY2013 - 22APR2014 | 20 | 1.107 | 0.141 | 0.93 | 1.0055 | 1.067 | 1.1855 | 1.458 | 0 | 0 | 0.0% |
| S190 | NOX | mg N/L | 18;180 | 07MAY2013 - 22APR2014 | 19 | 0.010 | 0.011 | 0.005 | 0.005 | 0.005 | 0.008 | 0.049 | 0 | 0 | 0.0% |
| S190 | TKN | mg N/L | 21 | 07MAY2013 - 22APR2014 | 20 | 1.102 | 0.144 | 0.93 | 0.98 | 1.06 | 1.18 | 1.45 | 0 | 0 | 0.0% |
| S190 | OPO4 | mg P/L | 23 | 07MAY2013 - 22APR2014 | 20 | 0.011 | 0.016 | 0.002 | 0.002 | 0.003 | 0.017 | 0.061 | 0 | 0 | 0.0% |
| S190 | TP | mg P/L | 25 | 07MAY2013 - 29APR2014 | 52 | 0.041 | 0.026 | 0.019 | 0.026 | 0.032 | 0.0415 | 0.126 | 0 | 0 | 0.0% |
| S190 | DIS. CA | mg/L | 30 | 16JUL2013 - 08APR2014 | 4 | 74.625 | 10.822 | 60.1 | 66.45 | 77.15 | 82.8 | 84.1 | 0 | 0 | 0.0% |
| S190 | DIS. K | mg/L | 29 | 16JUL2013 - 08APR2014 | 4 | 2.825 | 1.118 | 1.7 | 1.9 | 2.75 | 3.75 | 4.1 | 0 | 0 | 0.0% |
| S190 | DIS. MG | mg/L | 31 | 16JUL2013 - 08APR2014 | 4 | 5.875 | 1.318 | 4.1 | 4.9 | 6.15 | 6.85 | 7.1 | 0 | 0 | 0.0% |
| S190 | DIS. NA | mg/L | 28 | 16JUL2013 - 08APR2014 | 4 | 20.425 | 6.188 | 12.6 | 15.55 | 21.35 | 25.3 | 26.4 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S190 | TOT. CL | mg/L | 32 | 16JUL2013 - 08APR2014 | 6 | 22.283 | 13.990 | 6.5 | 8 | 21.6 | 37.1 | 38.9 | 0 | 0 | 0.0% |
| S190 | TOT. SO4 | mg/L | 33 | 16JUL2013 - 08APR2014 | 4 | 6.100 | 1.414 | 4.7 | 5 | 5.9 | 7.2 | 7.9 | 0 | 0 | 0.0% |
| S190 | CA_I | mg/L | 188 | 18SEP2013 - 29JAN2014 | 2 | 3.200 | 1.838 | 1.9 | 1.9 | 3.2 | 4.5 | 4.5 | 0 | 0 | 0.0% |
| S190Auto | TP | mg P/L | 25 | 18JUN2013 - 11MAR2014 | 22 | 0.063 | 0.026 | 0.027 | 0.043 | 0.062 | 0.079 | 0.123 | 0 | 0 | 0.0% |
| S332DX | DO | mg/L | 8 | 06MAY2013 - 28APR2014 | 52 | 2.749 | 1.722 | 0.31 | 1.395 | 2.33 | 3.625 | 6.71 | 0 | 35 | 67.3% |
| S332DX | FLDCOND. | UMHOS/CM | 9 | 06MAY2013 - 28APR2014 | 52 | 555.308 | 30.898 | 523 | 533.5 | 543.5 | 577 | 648 | 0 | 0 | 0.0% |
| S332DX | PH | UNITS | 10 | 06MAY2013 - 28APR2014 | 51 | 7.392 | 0.195 | 7.1 | 7.3 | 7.4 | 7.5 | 8 | 0 | 0 | 0.0% |
| S332DX | TURBIDITY | NTU | 12 | 08JUL2013 - 14APR2014 | 6 | 5.283 | 6.013 | 1 | 1 | 1.85 | 13 | 13 | 0 | 0 | 0.0% |
| S332DX | TSS | mg/L | 16 | 06MAY2013 - 28APR2014 | 44 | 3.000 | 0.000 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.0% |
| S332DX | HARDNESS | mg/L CACO3 | 35 | 06MAY2013 - 28APR2014 | 44 | 201.059 | 11.559 | 179.3 | 194.1 | 198.1 | 205.4 | 239.6 | 0 | 0 | 0.0% |
| S332DX | TEMP | CENT | 7 | 06MAY2013 - 28APR2014 | 52 | 26.604 | 1.567 | 21.7 | 25.75 | 26.55 | 27.9 | 28.9 | 0 | 0 | 0.0% |
| S332DX | TN | mg N/L | 80 | 06MAY2013 - 28APR2014 | 44 | 0.841 | 0.129 | 0.67 | 0.755 | 0.8135 | 0.8955 | 1.16 | 0 | 0 | 0.0% |
| S332DX | NOX | mg N/L | 18;180 | 29MAY2013 - 28APR2014 | 38 | 0.022 | 0.025 | 0.005 | 0.007 | 0.012 | 0.024 | 0.1 | 0 | 0 | 0.0% |
| S332DX | TKN | mg N/L | 21 | 06MAY2013 - 28APR2014 | 44 | 0.822 | 0.111 | 0.67 | 0.745 | 0.805 | 0.885 | 1.12 | 0 | 0 | 0.0% |
| S332DX | OPO4 | mg P/L | 23 | 06MAY2013 - 28APR2014 | 43 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S332DX | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 52 | 0.005 | 0.001 | 0.004 | 0.005 | 0.005 | 0.006 | 0.009 | 0 | 0 | 0.0% |
| S332DX | DIS. CA | mg/L | 30 | 06MAY2013 - 28APR2014 | 44 | 67.291 | 4.100 | 60.5 | 64.8 | 66.65 | 69.3 | 79 | 0 | 0 | 0.0% |
| S332DX | DIS. K | mg/L | 29 | 06MAY2013 - 28APR2014 | 44 | 2.659 | 0.283 | 2.3 | 2.5 | 2.6 | 2.8 | 3.9 | 0 | 0 | 0.0% |
| S332DX | DIS. MG | mg/L | 31 | 06MAY2013 - 28APR2014 | 44 | 8.018 | 0.805 | 6.8 | 7.45 | 8 | 8.35 | 11.1 | 0 | 0 | 0.0% |
| S332DX | DIS. NA | mg/L | 28 | 06MAY2013 - 28APR2014 | 44 | 34.002 | 3.205 | 29.4 | 31.8 | 33.8 | 35.1 | 45.1 | 0 | 0 | 0.0% |
| S332DX | TOT. CL | mg/L | 32 | 06MAY2013 - 28APR2014 | 46 | 49.804 | 9.752 | 10 | 48.2 | 50.5 | 53.7 | 67 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S332DX | TOT. SO4 | mg/L | 33 | 08JUL2013 - 14APR2014 | 4 | 1.600 | 0.876 | 0.4 | 0.95 | 1.85 | 2.25 | 2.3 | 0 | 0 | 0.0% |
| S332DX | TOT. ULTRA TRACE HG | µg/L | 207 | 09JUL2013 - 09APR2014 | 4 | 0.001 | 0.000 | 0.00021 | 0.000385 | 0.00058 | 0.000675 | 0.00075 | 0 | 0 | 0.0% |
| S332DX | TOT. MTHY HG | µg/L | 203 | 09JUL2013 - 09APR2014 | 4 | 0.000 | 0.000 | 0.000022 | 0.000066 | 0.000125 | 0.00014 | 0.00014 | 0 | 0 | 0.0% |
| S332DX | CA_I | mg/L | 188 | 16SEP2013 - 27JAN2014 | 2 | 2.850 | 0.212 | 2.7 | 2.7 | 2.85 | 3 | 3 | 0 | 0 | 0.0% |
| S332DX | DIS. ORGAN. C | mg/L | 89;181 | 08JUL2013 - 14APR2014 | 4 | 11.800 | 1.564 | 10.2 | 10.7 | 11.55 | 12.9 | 13.9 | 0 | 0 | 0.0% |
| S332DXAuto | TN | mg N/L | 80 | 06MAY2013 - 28APR2014 | 356 | 0.900 | 0.162 | 0.67 | 0.78 | 0.841 | 1.0055 | 1.375 | 0 | 0 | 0.0% |
| S332DXAuto | NOX | mg N/L | 18;180 | 13MAY2013 - 28APR2014 | 304 | 0.030 | 0.031 | 0.005 | 0.008 | 0.014 | 0.039 | 0.118 | 0 | 0 | 0.0% |
| S332DXAuto | TKN | mg N/L | 21 | 06MAY2013 - 28APR2014 | 356 | 0.875 | 0.139 | 0.67 | 0.77 | 0.83 | 0.955 | 1.29 | 0 | 0 | 0.0% |
| S332DXAuto | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 357 | 0.007 | 0.002 | 0.004 | 0.005 | 0.006 | 0.007 | 0.039 | 0 | 0 | 0.0% |
| S12D | DO | mg/L | 8 | 06MAY2013 - 31MAR2014 | 40 | 2.999 | 0.692 | 1.71 | 2.325 | 3.085 | 3.53 | 4.37 | 0 | 22 | 55.0% |
| S12D | FLDCOND. | UMHOS/CM | 9 | 06MAY2013 - 31MAR2014 | 40 | 530.933 | 93.615 | 276 | 513.25 | 542.6 | 587.3 | 684 | 0 | 0 | 0.0% |
| S12D | PH | UNITS | 10 | 06MAY2013 - 31MAR2014 | 40 | 7.298 | 0.151 | 7 | 7.2 | 7.3 | 7.4 | 7.8 | 0 | 0 | 0.0% |
| S12D | TEMP | CENT | 7 | 06MAY2013 - 31MAR2014 | 41 | 26.317 | 3.045 | 20.2 | 23.3 | 27.4 | 28.6 | 30.8 | 0 | 0 | 0.0% |
| S12D | TP | mg P/L | 25 | 06MAY2013 - 31MAR2014 | 41 | 0.008 | 0.002 | 0.006 | 0.007 | 0.007 | 0.009 | 0.012 | 0 | 0 | 0.0% |
| S34 | DO | mg/L | 8 | 14MAY2013 - 15APR2014 | 20 | 4.840 | 1.156 | 2.54 | 3.975 | 4.965 | 5.635 | 6.98 | 0 | 1 | 5.0% |
| S34 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 15APR2014 | 20 | 727.545 | 112.191 | 500 | 664.55 | 718.5 | 816.5 | 907 | 0 | 0 | 0.0% |
| S34 | PH | UNITS | 10 | 14MAY2013 - 15APR2014 | 20 | 7.590 | 0.168 | 7.1 | 7.6 | 7.6 | 7.7 | 7.8 | 0 | 0 | 0.0% |
| S34 | TURBIDITY | NTU | 12 | 14MAY2013 - 15APR2014 | 20 | 0.975 | 0.283 | 0.4 | 0.75 | 1 | 1.2 | 1.4 | 0 | 0 | 0.0% |
| S34 | HARDNESS | mg/L CACO3 | 35 | 09JUL2013 - 15APR2014 | 4 | 207.975 | 14.104 | 194.8 | 195.85 | 207.6 | 220.1 | 221.9 | 0 | 0 | 0.0% |
| S34 | TEMP | CENT | 7 | 14MAY2013 - 15APR2014 | 20 | 26.365 | 3.388 | 19.5 | 23.05 | 27.45 | 29.45 | 30.5 | 0 | 0 | 0.0% |
| S34 | TN | mg N/L | 80 | 14MAY2013 - 15APR2014 | 20 | 1.555 | 0.246 | 1.057 | 1.3325 | 1.5955 | 1.75 | 1.93 | 0 | 0 | 0.0% |
| S34 | NOX | mg N/L | 18;180 | 14MAY2013 - 15APR2014 | 20 | 0.023 | 0.022 | 0.005 | 0.0055 | 0.01 | 0.0405 | 0.069 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S34 | TKN | mg N/L | 21 | 14MAY2013 - 15APR2014 | 20 | 1.533 | 0.248 | 1.05 | 1.3 | 1.565 | 1.725 | 1.93 | 0 | 0 | 0.0% |
| S34 | OPO4 | mg P/L | 23 | 14MAY2013 - 15APR2014 | 20 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S34 | TP | mg P/L | 25 | 14MAY2013 - 15APR2014 | 20 | 0.012 | 0.005 | 0.007 | 0.0085 | 0.0105 | 0.0115 | 0.023 | 0 | 0 | 0.0% |
| S34 | DIS. CA | mg/L | 30 | 09JUL2013 - 15APR2014 | 4 | 50.675 | 0.960 | 49.7 | 49.85 | 50.75 | 51.5 | 51.5 | 0 | 0 | 0.0% |
| S34 | DIS. K | mg/L | 29 | 09JUL2013 - 15APR2014 | 4 | 6.200 | 0.841 | 5.3 | 5.5 | 6.2 | 6.9 | 7.1 | 0 | 0 | 0.0% |
| S34 | DIS. MG | mg/L | 31 | 09JUL2013 - 15APR2014 | 4 | 19.800 | 3.490 | 16.1 | 16.9 | 19.75 | 22.7 | 23.6 | 0 | 0 | 0.0% |
| S34 | DIS. NA | mg/L | 28 | 09JUL2013 - 15APR2014 | 4 | 70.750 | 10.597 | 61.2 | 62.6 | 68.55 | 78.9 | 84.7 | 0 | 0 | 0.0% |
| S34 | TOT. CL | mg/L | 32 | 09JUL2013 - 15APR2014 | 4 | 107.025 | 22.732 | 88.1 | 91.05 | 100.5 | 123 | 139 | 0 | 0 | 0.0% |
| S34 | TOT. SO4 | mg/L | 33 | 09JUL2013 - 15APR2014 | 4 | 27.050 | 9.683 | 17.6 | 18.7 | 27.6 | 35.4 | 35.4 | 0 | 0 | 0.0% |
| S142 | DO | mg/L | 8 | 14MAY2013 - 15APR2014 | 12 | 4.177 | 0.779 | 2.87 | 3.565 | 4.24 | 4.8 | 5.45 | 0 | 0 | 0.0% |
| S142 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 15APR2014 | 12 | 806.075 | 100.038 | 652 | 732.4 | 779 | 900.55 | 956 | 0 | 0 | 0.0% |
| S142 | PH | UNITS | 10 | 14MAY2013 - 15APR2014 | 12 | 7.542 | 0.138 | 7.3 | 7.45 | 7.55 | 7.6 | 7.8 | 0 | 0 | 0.0% |
| S142 | TURBIDITY | NTU | 12 | 14MAY2013 - 15APR2014 | 12 | 1.708 | 1.390 | 0.7 | 1.15 | 1.4 | 1.65 | 6 | 0 | 0 | 0.0% |
| S142 | TEMP | CENT | 7 | 14MAY2013 - 15APR2014 | 12 | 25.717 | 3.609 | 19.2 | 22.9 | 26.4 | 28.6 | 30.5 | 0 | 0 | 0.0% |
| S142 | TN | mg N/L | 80 | 14MAY2013 - 15APR2014 | 12 | 1.726 | 0.200 | 1.45 | 1.57 | 1.6735 | 1.916 | 2.05 | 0 | 0 | 0.0% |
| S142 | NOX | mg N/L | 18;180 | 14MAY2013 - 15APR2014 | 12 | 0.031 | 0.015 | 0.015 | 0.02 | 0.0275 | 0.038 | 0.069 | 0 | 0 | 0.0% |
| S142 | TKN | mg N/L | 21 | 14MAY2013 - 15APR2014 | 12 | 1.695 | 0.204 | 1.41 | 1.53 | 1.645 | 1.89 | 2.03 | 0 | 0 | 0.0% |
| S142 | TP | mg P/L | 25 | 14MAY2013 - 15APR2014 | 12 | 0.014 | 0.006 | 0.008 | 0.0105 | 0.0115 | 0.0155 | 0.03 | 0 | 0 | 0.0% |
| S142 | TOT. SO4 | mg/L | 33 | 09JUL2013 - 15APR2014 | 4 | 36.975 | 14.574 | 20.7 | 25.1 | 37.1 | 48.85 | 53 | 0 | 0 | 0.0% |
| S11A | DO | mg/L | 8 | 14MAY2013 - 29APR2014 | 21 | 5.320 | 1.538 | 3.03 | 4.36 | 5.07 | 6.11 | 8.3 | 0 | 0 | 0.0% |
| S11A | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 29APR2014 | 21 | 799.095 | 148.303 | 476 | 720 | 779.1 | 820 | 1111 | 0 | 0 | 0.0% |
| S11A | PH | UNITS | 10 | 14MAY2013 - 29APR2014 | 21 | 7.667 | 0.211 | 7.3 | 7.6 | 7.7 | 7.7 | 8.2 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S11A | TURBIDITY | NTU | 12 | 14MAY2013 - 29APR2014 | 21 | 1.157 | 0.343 | 0.7 | 0.9 | 1.1 | 1.3 | 1.9 | 0 | 0 | 0.0% |
| S11A | TSS | mg/L | 16 | 14MAY2013 - 29APR2014 | 19 | 3.000 | 0.000 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.0% |
| S11A | HARDNESS | mg/L CACO3 | 35 | 14MAY2013 - 29APR2014 | 19 | 225.005 | 43.716 | 125.8 | 190.4 | 221.1 | 262.3 | 301 | 0 | 0 | 0.0% |
| S11A | TEMP | CENT | 7 | 14MAY2013 - 29APR2014 | 21 | 26.786 | 3.411 | 18.3 | 23.8 | 27.6 | 29.8 | 30.9 | 0 | 0 | 0.0% |
| S11A | ALKALINITY | mg/L | 67 | 14MAY2013 - 29APR2014 | 19 | 181.632 | 35.739 | 100 | 164 | 176 | 209 | 262 | 0 | 0 | 0.0% |
| S11A | TN | mg N/L | 80 | 14MAY2013 - 29APR2014 | 21 | 1.763 | 0.303 | 1.12 | 1.622 | 1.72 | 1.855 | 2.308 | 0 | 0 | 0.0% |
| S11A | NOX | mg N/L | 18;180 | 14MAY2013 - 29APR2014 | 21 | 0.016 | 0.016 | 0.005 | 0.005 | 0.005 | 0.028 | 0.053 | 0 | 0 | 0.0% |
| S11A | NH4 | mg N/L | 20 | 14MAY2013 - 29APR2014 | 19 | 0.030 | 0.014 | 0.014 | 0.02 | 0.028 | 0.035 | 0.07 | 0 | 0 | 0.0% |
| S11A | UN-IONIZED AMMONIA | mg/L | NONE | 14MAY2013 - 29APR2014 | 19 | 0.001 | 0.001 | 0.000261428 | 0.000624224 | 0.000975913 | 0.001407359 | 0.002713312 | 0 | 0 | 0.0% |
| S11A | NNH4 | mg N/L | 92 | 14MAY2013 - 29APR2014 | 19 | 0.043 | 0.025 | 0.014 | 0.02 | 0.036 | 0.063 | 0.095 | 0 | 0 | 0.0% |
| S11A | ORGN | mg N/L | 79 | 14MAY2013 - 29APR2014 | 19 | 1.693 | 0.285 | 1.1 | 1.565 | 1.695 | 1.779 | 2.23 | 0 | 0 | 0.0% |
| S11A | TKN | mg N/L | 21 | 14MAY2013 - 29APR2014 | 21 | 1.750 | 0.301 | 1.12 | 1.6 | 1.72 | 1.81 | 2.3 | 0 | 0 | 0.0% |
| S11A | OPO4 | mg P/L | 23 | 14MAY2013 - 29APR2014 | 19 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S11A | TP | mg P/L | 25 | 14MAY2013 - 29APR2014 | 21 | 0.011 | 0.006 | 0.005 | 0.006 | 0.008 | 0.012 | 0.026 | 0 | 0 | 0.0% |
| S11A | DIS. CA | mg/L | 30 | 14MAY2013 - 29APR2014 | 19 | 55.679 | 11.649 | 34.4 | 47.7 | 53.6 | 62.7 | 78.9 | 0 | 0 | 0.0% |
| S11A | DIS. K | mg/L | 29 | 14MAY2013 - 29APR2014 | 19 | 6.721 | 1.387 | 3.8 | 6.1 | 6.7 | 7.3 | 9.2 | 0 | 0 | 0.0% |
| S11A | DIS. MG | mg/L | 31 | 14MAY2013 - 29APR2014 | 19 | 20.879 | 4.777 | 9.7 | 18.2 | 20.9 | 23.5 | 29.4 | 0 | 0 | 0.0% |
| S11A | DIS. NA | mg/L | 28 | 14MAY2013 - 29APR2014 | 19 | 73.353 | 18.228 | 44 | 63.1 | 66.7 | 75.4 | 113 | 0 | 0 | 0.0% |
| S11A | TOT. CL | mg/L | 32 | 14MAY2013 - 29APR2014 | 19 | 111.958 | 29.234 | 64.7 | 98.3 | 103 | 113 | 173 | 0 | 0 | 0.0% |
| S11A | TOT. SO4 | mg/L | 33 | 14MAY2013 - 29APR2014 | 20 | 35.370 | 11.377 | 10.5 | 27.75 | 32.3 | 43.5 | 58.7 | 0 | 0 | 0.0% |
| S11A | DIS. SILICA | mg/L | 27 | 14MAY2013 - 29APR2014 | 19 | 13.277 | 2.632 | 7.7 | 12 | 13.6 | 14.9 | 16.8 | 0 | 0 | 0.0% |
| S11A | TOT. FE | mg/L | 177 | 09JUL2013 - 15APR2014 | 4 | 0.009 | 0.004 | 0.004 | 0.0055 | 0.009 | 0.0125 | 0.014 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S11A | DIS. CA | mg/L | 30 | 14MAY2012 - 30APR2013 | 26 | 55.12308 | 14.17952 | 28.7 | 44.8 | 54.6 | 64.8 | 80.6 | 0 | 0 | 0.00% |
| S11A | DIS. K | mg/L | 29 | 14MAY2012 - 30APR2013 | 26 | 6.896154 | 2.249174 | 2.7 | 5.4 | 7.1 | 8.7 | 10 | 0 | 0 | 0.00% |
| S11A | DIS. MG | mg/L | 31 | 14MAY2012 - 30APR2013 | 26 | 20.59231 | 6.427934 | 9.5 | 14.8 | 21.6 | 26.1 | 30.8 | 0 | 0 | 0.00% |
| S11A | DIS. NA | mg/L | 28 | 14MAY2012 - 30APR2013 | 26 | 72.09231 | 20.52491 | 38.8 | 57.8 | 73.05 | 83.4 | 116.8 | 0 | 0 | 0.00% |
| S11A | TOT. CL | mg/L | 32 | 14MAY2012 - 30APR2013 | 25 | 110.328 | 34.22967 | 53 | 87.7 | 113 | 127 | 180 | 0 | 0 | 0.00% |
| S11A | TOT. SO4 | mg/L | 33 | 14MAY2012 - 30APR2013 | 25 | 30.644 | 14.58218 | 5.3 | 24.6 | 33.1 | 40.3 | 51 | 0 | 0 | 0.00% |
| S11A | DIS. SILICA | mg/L | 27 | 14MAY2012 - 30APR2013 | 26 | 12.08731 | 4.131938 | 5.57 | 9.5 | 11.7 | 13.8 | 23.5 | 0 | 0 | 0.00% |
| S11A | TOT. FE | mg/L | 177 | 09JUL2012 - 25APR2013 | 5 | 0.019 | 0.011895 | 0.005 | 0.009 | 0.022 | 0.025 | 0.034 | 0 | 0 | 0.00% |
| S11A | DIS. KJEL N | mg N/L | 22 | 14MAY2012 - 30APR2013 | 26 | 1.590769 | 0.337922 | 0.95 | 1.36 | 1.6 | 1.81 | 2.24 | 0 | 0 | 0.00% |
| S11A | DIS. ORGAN. C | mg/L | 89;181 | 14MAY2012 - 30APR2013 | 26 | 26.88462 | 6.169388 | 14.3 | 23.4 | 26.9 | 31.4 | 37.6 | 0 | 0 | 0.00% |
| S11A | TOT. DIS. P | mg P/L | 26 | 14MAY2012 - 30APR2013 | 26 | 0.0055 | 0.003547 | 0.002 | 0.003 | 0.004 | 0.007 | 0.015 | 0 | 0 | 0.00% |
| S11A | TOT. ORGAN. C | mg/L | 100 | 14MAY2012 - 30APR2013 | 26 | 27.08077 | 6.336625 | 13.8 | 23 | 27.6 | 32 | 38.6 | 0 | 0 | 0.00% |
| S145 | DO | mg/L | 8 | 14MAY2012 - 30APR2013 | 20 | 4.2575 | 2.098192 | 1.83 | 2.61 | 4.265 | 5.29 | 10.5 | 0 | 14 | 70.00% |
| S145 | FLDCOND. | UMHOS/CM | 9 | 14MAY2012 - 30APR2013 | 21 | 621.2333 | 230.5181 | 278 | 415 | 516.7 | 847 | 953 | 0 | 0 | 0.00% |
| S145 | PH | UNITS | 10 | 14MAY2012 - 30APR2013 | 21 | 7.419048 | 0.193956 | 7.1 | 7.3 | 7.4 | 7.6 | 7.7 | 0 | 0 | 0.00% |
| S145 | TURBIDITY | NTU | 12 | 14MAY2012 - 30APR2013 | 21 | 1.252381 | 0.781421 | 0.6 | 0.8 | 1 | 1.4 | 3.9 | 0 | 0 | 0.00% |
| S145 | TSS | mg/L | 16 | 14MAY2012 - 30APR2013 | 21 | 3 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.00% |
| S145 | HARDNESS | mg/L CACO3 | 35 | 14MAY2012 - 30APR2013 | 21 | 167.8143 | 59.9939 | 65.3 | 108 | 169 | 223.9 | 248.2 | 0 | 0 | 0.00% |
| S145 | TEMP | CENT | 7 | 14MAY2012 - 30APR2013 | 21 | 24.82381 | 4.526909 | 16.3 | 21.2 | 26.2 | 28.7 | 30.9 | 0 | 0 | 0.00% |
| S145 | ALKALINITY | mg/L | 67 | 14MAY2012 - 30APR2013 | 21 | 145.9524 | 48.62044 | 58 | 100 | 145 | 196 | 210 | 0 | 0 | 0.00% |
| S145 | TN | mg N/L | 80 | 14MAY2012 - 30APR2013 | 21 | 1.560286 | 0.471796 | 0.898 | 1.17 | 1.32 | 1.9 | 2.592 | 0 | 0 | 0.00% |
| S145 | NOX | mg N/L | 18;180 | 14MAY2012 - 30APR2013 | 21 | 0.011 | 0.014792 | 0.005 | 0.005 | 0.006 | 0.011 | 0.073 | 0 | 0 | 0.00% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S11A | DIS. KJEL N | mg N/L | 22 | 14MAY2013 - 29APR2014 | 19 | 1.661 | 0.276 | 1.07 | 1.54 | 1.65 | 1.76 | 2.19 | 0 | 0 | 0.0% |
| S11A | DIS. ORGAN. C | mg/L | 89;181 | 14MAY2013 - 29APR2014 | 19 | 28.074 | 4.974 | 17.9 | 27 | 27.7 | 29.4 | 37 | 0 | 0 | 0.0% |
| S11A | TOT. DIS. P | mg P/L | 26 | 14MAY2013 - 29APR2014 | 19 | 0.004 | 0.002 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 | 0 | 0 | 0.0% |
| S11A | TOT. ORGAN. C | mg/L | 100 | 14MAY2013 - 29APR2014 | 19 | 28.274 | 4.903 | 17.9 | 26.9 | 28.1 | 29.3 | 37.1 | 0 | 0 | 0.0% |
| S145 | DO | mg/L | 8 | 14MAY2013 - 15APR2014 | 22 | 4.559 | 1.201 | 2.12 | 3.65 | 4.78 | 5.57 | 6.44 | 0 | 2 | 9.1% |
| S145 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 15APR2014 | 22 | 712.300 | 163.983 | 325 | 658 | 738 | 820 | 986 | 0 | 0 | 0.0% |
| S145 | PH | UNITS | 10 | 14MAY2013 - 15APR2014 | 22 | 7.527 | 0.139 | 7.2 | 7.5 | 7.55 | 7.6 | 7.7 | 0 | 0 | 0.0% |
| S145 | TURBIDITY | NTU | 12 | 14MAY2013 - 15APR2014 | 22 | 0.773 | 0.257 | 0.4 | 0.6 | 0.75 | 0.9 | 1.4 | 0 | 0 | 0.0% |
| S145 | TSS | mg/L | 16 | 14MAY2013 - 15APR2014 | 21 | 3.000 | 0.000 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.0% |
| S145 | HARDNESS | mg/L CACO3 | 35 | 14MAY2013 - 15APR2014 | 21 | 186.862 | 42.545 | 90.2 | 163.5 | 202 | 216.9 | 242.4 | 0 | 0 | 0.0% |
| S145 | TEMP | CENT | 7 | 14MAY2013 - 15APR2014 | 22 | 25.232 | 4.015 | 16.7 | 22.9 | 25.1 | 29 | 31 | 0 | 0 | 0.0% |
| S145 | ALKALINITY | mg/L | 67 | 14MAY2013 - 15APR2014 | 21 | 161.667 | 36.682 | 81 | 150 | 171 | 189 | 205 | 0 | 0 | 0.0% |
| S145 | TN | mg N/L | 80 | 14MAY2013 - 15APR2014 | 22 | 1.609 | 0.291 | 0.987 | 1.5 | 1.695 | 1.755 | 2.165 | 0 | 0 | 0.0% |
| S145 | NOX | mg N/L | 18;180 | 14MAY2013 - 15APR2014 | 22 | 0.009 | 0.010 | 0.005 | 0.005 | 0.005 | 0.007 | 0.047 | 0 | 0 | 0.0% |
| S145 | NH4 | mg N/L | 20 | 14MAY2013 - 15APR2014 | 21 | 0.029 | 0.017 | 0.008 | 0.02 | 0.021 | 0.03 | 0.071 | 0 | 0 | 0.0% |
| S145 | UN-IONIZED AMMONIA | mg/L | NONE | 14MAY2013 - 15APR2014 | 21 | 0.001 | 0.000 | 0.000226662 | 0.000369927 | 0.000494296 | 0.000936794 | 0.002175693 | 0 | 0 | 0.0% |
| S145 | NNH4 | mg N/L | 92 | 14MAY2013 - 15APR2014 | 21 | 0.035 | 0.022 | 0.008 | 0.02 | 0.025 | 0.055 | 0.076 | 0 | 0 | 0.0% |
| S145 | ORGN | mg N/L | 79 | 14MAY2013 - 15APR2014 | 21 | 1.575 | 0.289 | 0.955 | 1.48 | 1.663 | 1.734 | 2.089 | 0 | 0 | 0.0% |
| S145 | TKN | mg N/L | 21 | 14MAY2013 - 15APR2014 | 22 | 1.603 | 0.290 | 0.98 | 1.5 | 1.695 | 1.75 | 2.16 | 0 | 0 | 0.0% |
| S145 | OPO4 | mg P/L | 23 | 14MAY2013 - 15APR2014 | 20 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S145 | TP | mg P/L | 25 | 14MAY2013 - 15APR2014 | 22 | 0.008 | 0.003 | 0.005 | 0.006 | 0.006 | 0.009 | 0.015 | 0 | 0 | 0.0% |
| S145 | DIS. CA | mg/L | 30 | 14MAY2013 - 15APR2014 | 21 | 45.819 | 8.848 | 25.9 | 43.2 | 47.8 | 53.5 | 59.1 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S145 | DIS. K | mg/L | 29 | 14MAY2013 - 15APR2014 | 21 | 5.995 | 1.561 | 2.5 | 5.4 | 6.2 | 6.9 | 9 | 0 | 0 | 0.0% |
| S145 | DIS. MG | mg/L | 31 | 14MAY2013 - 15APR2014 | 21 | 17.590 | 5.367 | 6.2 | 14.1 | 19 | 21.6 | 24.1 | 0 | 0 | 0.0% |
| S145 | DIS. NA | mg/L | 28 | 14MAY2013 - 15APR2014 | 21 | 69.857 | 18.189 | 28.8 | 61.7 | 74.4 | 83.6 | 97.6 | 0 | 0 | 0.0% |
| S145 | TOT. CL | mg/L | 32 | 14MAY2013 - 15APR2014 | 21 | 106.752 | 31.924 | 40.3 | 94 | 109 | 127 | 176 | 0 | 0 | 0.0% |
| S145 | TOT. SO4 | mg/L | 33 | 14MAY2013 - 15APR2014 | 21 | 23.586 | 9.649 | 5.3 | 15.7 | 23.9 | 33.3 | 37.8 | 0 | 0 | 0.0% |
| S145 | DIS. SILICA | mg/L | 27 | 14MAY2013 - 15APR2014 | 21 | 13.131 | 4.045 | 3.84 | 10.2 | 14.1 | 16.8 | 17.9 | 0 | 0 | 0.0% |
| S145 | TOT. FE | mg/L | 177 | 09JUL2013 - 15APR2014 | 4 | 0.008 | 0.002 | 0.005 | 0.0065 | 0.008 | 0.0085 | 0.009 | 0 | 0 | 0.0% |
| S145 | DIS. KJEL N | mg N/L | 22 | 14MAY2013 - 15APR2014 | 21 | 1.527 | 0.278 | 0.93 | 1.41 | 1.62 | 1.66 | 2.04 | 0 | 0 | 0.0% |
| S145 | DIS. ORGAN. C | mg/L | 89;181 | 14MAY2013 - 15APR2014 | 21 | 26.290 | 5.181 | 14.2 | 24.7 | 27.2 | 28.6 | 36.6 | 0 | 0 | 0.0% |
| S145 | TOT. DIS. P | mg P/L | 26 | 14MAY2013 - 15APR2014 | 21 | 0.003 | 0.001 | 0.002 | 0.002 | 0.003 | 0.004 | 0.006 | 0 | 0 | 0.0% |
| S145 | TOT. ORGAN. C | mg/L | 100 | 14MAY2013 - 15APR2014 | 21 | 26.348 | 5.283 | 14.3 | 25.4 | 27.2 | 29.1 | 36.7 | 0 | 0 | 0.0% |
| S151 | DO | mg/L | 8 | 13MAY2013 - 14APR2014 | 32 | 3.447 | 1.072 | 1.8 | 2.645 | 3.215 | 4.31 | 5.43 | 0 | 16 | 50.0% |
| S151 | FLDCOND. | UMHOS/CM | 9 | 13MAY2013 - 14APR2014 | 33 | 703.164 | 86.623 | 523 | 683 | 712.4 | 727 | 942 | 0 | 0 | 0.0% |
| S151 | PH | UNITS | 10 | 13MAY2013 - 14APR2014 | 33 | 7.427 | 0.159 | 7.1 | 7.3 | 7.4 | 7.6 | 7.8 | 0 | 0 | 0.0% |
| S151 | TURBIDITY | NTU | 12 | 13MAY2013 - 14APR2014 | 18 | 1.200 | 0.661 | 0.7 | 0.9 | 1 | 1.2 | 3.4 | 0 | 0 | 0.0% |
| S151 | HARDNESS | mg/L CACO3 | 35 | 08JUL2013 - 14APR2014 | 4 | 240.050 | 31.337 | 222.7 | 223.4 | 225.25 | 256.7 | 287 | 0 | 0 | 0.0% |
| S151 | TEMP | CENT | 7 | 13MAY2013 - 14APR2014 | 33 | 25.236 | 3.371 | 17.8 | 22.6 | 26.1 | 27.7 | 30.5 | 0 | 0 | 0.0% |
| S151 | TN | mg N/L | 80 | 13MAY2013 - 14APR2014 | 18 | 1.482 | 0.189 | 1.063 | 1.422 | 1.497 | 1.578 | 1.837 | 0 | 0 | 0.0% |
| S151 | NOX | mg N/L | 18;180 | 13MAY2013 - 14APR2014 | 17 | 0.046 | 0.025 | 0.016 | 0.026 | 0.038 | 0.061 | 0.097 | 0 | 0 | 0.0% |
| S151 | TKN | mg N/L | 21 | 13MAY2013 - 14APR2014 | 18 | 1.439 | 0.182 | 1.04 | 1.37 | 1.475 | 1.52 | 1.74 | 0 | 0 | 0.0% |
| S151 | OPO4 | mg P/L | 23 | 13MAY2013 - 14APR2014 | 18 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S151 | TP | mg P/L | 25 | 13MAY2013 - 14APR2014 | 33 | 0.011 | 0.002 | 0.008 | 0.009 | 0.01 | 0.011 | 0.018 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S151 | DIS. CA | mg/L | 30 | 08JUL2013 - 14APR2014 | 4 | 64.475 | 7.221 | 59.1 | 59.2 | 62.15 | 69.75 | 74.5 | 0 | 0 | 0.0% |
| S151 | DIS. K | mg/L | 29 | 08JUL2013 - 14APR2014 | 4 | 5.525 | 0.943 | 4.4 | 4.9 | 5.5 | 6.15 | 6.7 | 0 | 0 | 0.0% |
| S151 | DIS. MG | mg/L | 31 | 08JUL2013 - 14APR2014 | 4 | 19.200 | 3.789 | 15.5 | 16.9 | 18.4 | 21.5 | 24.5 | 0 | 0 | 0.0% |
| S151 | DIS. NA | mg/L | 28 | 08JUL2013 - 14APR2014 | 4 | 64.875 | 13.243 | 57 | 57.2 | 58.95 | 72.55 | 84.6 | 0 | 0 | 0.0% |
| S151 | TOT. CL | mg/L | 32 | 08JUL2013 - 14APR2014 | 4 | 98.975 | 21.735 | 83.7 | 85.65 | 90.6 | 112.3 | 131 | 0 | 0 | 0.0% |
| S151 | TOT. SO4 | mg/L | 33 | 08JUL2013 - 14APR2014 | 4 | 26.650 | 12.400 | 9.2 | 17.8 | 30.85 | 35.5 | 35.7 | 0 | 0 | 0.0% |
| S151Auto | TP | mg P/L | 25 | 03SEP2013 - 27JAN2014 | 22 | 0.011 | 0.003 | 0.008 | 0.009 | 0.01 | 0.012 | 0.019 | 0 | 0 | 0.0% |
| S356-334 | DO | mg/L | 8 | 06MAY2013 - 28APR2014 | 50 | 2.218 | 1.140 | 0.3 | 1.43 | 2.05 | 2.74 | 5.09 | 0 | 41 | 82.0% |
| S356-334 | FLDCOND. | UMHOS/CM | 9 | 06MAY2013 - 28APR2014 | 50 | 569.686 | 56.053 | 470 | 536.3 | 550.15 | 609.9 | 720.5 | 0 | 0 | 0.0% |
| S356-334 | PH | UNITS | 10 | 06MAY2013 - 28APR2014 | 51 | 7.239 | 0.151 | 7 | 7.1 | 7.2 | 7.3 | 7.8 | 0 | 0 | 0.0% |
| S356-334 | TURBIDITY | NTU | 12 | 08JUL2013 - 14APR2014 | 3 | 3.500 | 2.987 | 1.3 | 1.3 | 2.3 | 6.9 | 6.9 | 0 | 0 | 0.0% |
| S356-334 | TSS | mg/L | 16 | 06MAY2013 - 28APR2014 | 30 | 5.200 | 3.773 | 3 | 3 | 3 | 7 | 15 | 0 | 0 | 0.0% |
| S356-334 | HARDNESS | mg/L CACO3 | 35 | 06MAY2013 - 28APR2014 | 30 | 194.380 | 18.977 | 152.9 | 185.8 | 192 | 202.5 | 236 | 0 | 0 | 0.0% |
| S356-334 | TEMP | CENT | 7 | 06MAY2013 - 28APR2014 | 52 | 26.962 | 2.046 | 23 | 25.15 | 27.15 | 28.65 | 30.7 | 0 | 0 | 0.0% |
| S356-334 | TN | mg N/L | 80 | 06MAY2013 - 28APR2014 | 30 | 1.271 | 0.130 | 1.056 | 1.182 | 1.2715 | 1.329 | 1.563 | 0 | 0 | 0.0% |
| S356-334 | NOX | mg N/L | 18;180 | 06MAY2013 - 28APR2014 | 28 | 0.033 | 0.025 | 0.005 | 0.0155 | 0.024 | 0.044 | 0.103 | 0 | 0 | 0.0% |
| S356-334 | TKN | mg N/L | 21 | 06MAY2013 - 28APR2014 | 30 | 1.240 | 0.121 | 1.02 | 1.16 | 1.25 | 1.29 | 1.51 | 0 | 0 | 0.0% |
| S356-334 | OPO4 | mg P/L | 23 | 06MAY2013 - 28APR2014 | 29 | 0.002 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 | 0.006 | 0 | 0 | 0.0% |
| S356-334 | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 52 | 0.010 | 0.003 | 0.005 | 0.007 | 0.009 | 0.012 | 0.021 | 0 | 0 | 0.0% |
| S356-334 | DIS. CA | mg/L | 30 | 06MAY2013 - 28APR2014 | 30 | 59.283 | 8.158 | 46.7 | 53.2 | 57.25 | 66.3 | 79.1 | 0 | 0 | 0.0% |
| S356-334 | DIS. K | mg/L | 29 | 06MAY2013 - 28APR2014 | 30 | 3.643 | 1.046 | 1.8 | 2.9 | 3.75 | 4.2 | 5.6 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S356-334 | DIS. MG | mg/L | 31 | 06MAY2013 - 28APR2014 | 30 | 11.250 | 2.569 | 6.8 | 9.5 | 11.6 | 12.6 | 16 | 0 | 0 | 0.0% |
| S356-334 | DIS. NA | mg/L | 28 | 06MAY2013 - 28APR2014 | 30 | 41.923 | 8.020 | 27.1 | 36.7 | 41.35 | 47.8 | 59 | 0 | 0 | 0.0% |
| S356-334 | TOT. CL | mg/L | 32 | 06MAY2013 - 28APR2014 | 30 | 63.770 | 12.877 | 45.7 | 52.1 | 61.8 | 74.6 | 89.4 | 0 | 0 | 0.0% |
| S356-334 | TOT. SO4 | mg/L | 33 | 08JUL2013 - 14APR2014 | 4 | 7.800 | 8.459 | 0.5 | 0.65 | 6.75 | 14.95 | 17.2 | 0 | 0 | 0.0% |
| S356-334Auto | TN | mg N/L | 80 | 06MAY2013 - 28APR2014 | 340 | 1.325 | 0.135 | 1.01 | 1.2445 | 1.3145 | 1.4015 | 2.23 | 0 | 0 | 0.0% |
| S356-334Auto | NOX | mg N/L | 18;180 | 06MAY2013 - 28APR2014 | 307 | 0.028 | 0.026 | 0.005 | 0.011 | 0.018 | 0.039 | 0.173 | 0 | 0 | 0.0% |
| S356-334Auto | TKN | mg N/L | 21 | 06MAY2013 - 28APR2014 | 340 | 1.300 | 0.131 | 1.01 | 1.22 | 1.3 | 1.38 | 2.23 | 0 | 0 | 0.0% |
| S356-334Auto | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 340 | 0.011 | 0.014 | 0.006 | 0.008 | 0.009 | 0.012 | 0.265 | 0 | 0 | 0.0% |
| S333 | DO | mg/L | 8 | 06MAY2013 - 28APR2014 | 50 | 3.237 | 1.116 | 1.82 | 2.27 | 3.195 | 3.69 | 7.65 | 0 | 27 | 54.0% |
| S333 | FLDCOND. | UMHOS/CM | 9 | 06MAY2013 - 28APR2014 | 50 | 588.554 | 108.592 | 356.2 | 527.8 | 557.3 | 660.1 | 799.6 | 0 | 0 | 0.0% |
| S333 | PH | UNITS | 10 | 06MAY2013 - 28APR2014 | 51 | 7.314 | 0.123 | 7 | 7.2 | 7.3 | 7.4 | 7.6 | 0 | 0 | 0.0% |
| S333 | TURBIDITY | NTU | 12 | 08JUL2013 - 14APR2014 | 3 | 1.167 | 0.551 | 0.8 | 0.8 | 0.9 | 1.8 | 1.8 | 0 | 0 | 0.0% |
| S333 | TSS | mg/L | 16 | 06MAY2013 - 28APR2014 | 47 | 3.404 | 1.651 | 3 | 3 | 3 | 3 | 13 | 0 | 0 | 0.0% |
| S333 | HARDNESS | mg/L CACO3 | 35 | 06MAY2013 - 28APR2014 | 47 | 194.272 | 24.916 | 139.1 | 175.9 | 187 | 215 | 249.4 | 0 | 0 | 0.0% |
| S333 | TEMP | CENT | 7 | 06MAY2013 - 28APR2014 | 52 | 25.646 | 3.312 | 17.8 | 22.95 | 25.85 | 28.4 | 30.9 | 0 | 0 | 0.0% |
| S333 | TN | mg N/L | 80 | 06MAY2013 - 28APR2014 | 47 | 1.247 | 0.219 | 0.72 | 1.076 | 1.182 | 1.398 | 1.702 | 0 | 0 | 0.0% |
| S333 | NOX | mg N/L | 18;180 | 06MAY2013 - 28APR2014 | 43 | 0.053 | 0.066 | 0.005 | 0.021 | 0.039 | 0.059 | 0.442 | 0 | 0 | 0.0% |
| S333 | TKN | mg N/L | 21 | 06MAY2013 - 28APR2014 | 47 | 1.198 | 0.192 | 0.72 | 1.05 | 1.16 | 1.36 | 1.58 | 0 | 0 | 0.0% |
| S333 | OPO4 | mg P/L | 23 | 06MAY2013 - 28APR2014 | 46 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 | 0 | 0 | 0.0% |
| S333 | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 52 | 0.009 | 0.003 | 0.005 | 0.007 | 0.008 | 0.0105 | 0.018 | 0 | 0 | 0.0% |
| S333 | DIS. CA | mg/L | 30 | 06MAY2013 - 28APR2014 | 47 | 55.336 | 5.442 | 46.8 | 51.1 | 53.4 | 59.2 | 68.1 | 0 | 0 | 0.0% |
| S333 | DIS. K | mg/L | 29 | 06MAY2013 - 28APR2014 | 47 | 4.530 | 0.997 | 1.8 | 4 | 4.3 | 5.1 | 7 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S333 | DIS. MG | mg/L | 31 | 06MAY2013 - 28APR2014 | 47 | 13.626 | 3.248 | 4.5 | 11.9 | 12.9 | 15.7 | 21.1 | 0 | 0 | 0.0% |
| S333 | DIS. NA | mg/L | 28 | 06MAY2013 - 28APR2014 | 47 | 47.826 | 11.356 | 22 | 40.3 | 44.3 | 54.1 | 76.7 | 0 | 0 | 0.0% |
| S333 | TOT. CL | mg/L | 32 | 06MAY2013 - 28APR2014 | 47 | 72.977 | 17.477 | 32.6 | 62.5 | 66.9 | 82.9 | 109 | 0 | 0 | 0.0% |
| S333 | TOT. SO4 | mg/L | 33 | 08JUL2013 - 14APR2014 | 4 | 13.425 | 9.333 | 0.5 | 7.75 | 15.2 | 19.1 | 22.8 | 0 | 0 | 0.0% |
| S333Auto | TN | mg N/L | 80 | 06MAY2013 - 28APR2014 | 349 | 1.234 | 0.263 | 0.5 | 1.088 | 1.178 | 1.43 | 2.012 | 0 | 0 | 0.0% |
| S333Auto | NOX | mg N/L | 18;180 | 06MAY2013 - 28APR2014 | 312 | 0.046 | 0.044 | 0.005 | 0.02 | 0.038 | 0.06 | 0.381 | 0 | 0 | 0.0% |
| S333Auto | TKN | mg N/L | 21 | 06MAY2013 - 28APR2014 | 347 | 1.197 | 0.241 | 0.64 | 1.05 | 1.15 | 1.39 | 1.97 | 0 | 0 | 0.0% |
| S333Auto | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 348 | 0.012 | 0.007 | 0.006 | 0.008 | 0.01 | 0.012 | 0.06 | 0 | 0 | 0.0% |
| C123SR84 | DO | mg/L | 8 | 14MAY2013 - 15APR2014 | 16 | 2.999 | 1.862 | 1.03 | 1.545 | 2.43 | 4.175 | 7.36 | 0 | 10 | 62.5% |
| C123SR84 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 15APR2014 | 17 | 568.276 | 68.998 | 466 | 510.8 | 565.2 | 619.4 | 694.1 | 0 | 0 | 0.0% |
| C123SR84 | PH | UNITS | 10 | 14MAY2013 - 15APR2014 | 17 | 7.359 | 0.287 | 7 | 7.2 | 7.2 | 7.5 | 8 | 0 | 0 | 0.0% |
| C123SR84 | TURBIDITY | NTU | 12 | 14MAY2013 - 15APR2014 | 17 | 1.788 | 0.949 | 0.7 | 1 | 1.4 | 2.6 | 3.4 | 0 | 0 | 0.0% |
| C123SR84 | HARDNESS | mg/L CACO3 | 35 | 09JUL2013 - 15APR2014 | 4 | 219.550 | 28.892 | 189.2 | 194.95 | 220.95 | 244.15 | 247.1 | 0 | 0 | 0.0% |
| C123SR84 | TEMP | CENT | 7 | 14MAY2013 - 15APR2014 | 17 | 26.671 | 3.037 | 19.9 | 24.9 | 27.5 | 29.3 | 30.1 | 0 | 0 | 0.0% |
| C123SR84 | TN | mg N/L | 80 | 14MAY2013 - 15APR2014 | 17 | 1.286 | 0.156 | 1.042 | 1.131 | 1.33 | 1.41 | 1.479 | 0 | 0 | 0.0% |
| C123SR84 | NOX | mg N/L | 18;180 | 14MAY2013 - 15APR2014 | 17 | 0.025 | 0.041 | 0.005 | 0.005 | 0.011 | 0.028 | 0.178 | 0 | 0 | 0.0% |
| C123SR84 | TKN | mg N/L | 21 | 14MAY2013 - 15APR2014 | 17 | 1.263 | 0.152 | 1.03 | 1.12 | 1.25 | 1.41 | 1.45 | 0 | 0 | 0.0% |
| C123SR84 | OPO4 | mg P/L | 23 | 14MAY2013 - 15APR2014 | 17 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.012 | 0 | 0 | 0.0% |
| C123SR84 | TP | mg P/L | 25 | 14MAY2013 - 15APR2014 | 17 | 0.021 | 0.009 | 0.012 | 0.014 | 0.017 | 0.021 | 0.041 | 0 | 0 | 0.0% |
| C123SR84 | DIS. CA | mg/L | 30 | 09JUL2013 - 15APR2014 | 4 | 70.250 | 10.776 | 60.4 | 60.95 | 70.05 | 79.55 | 80.5 | 0 | 0 | 0.0% |
| C123SR84 | DIS. K | mg/L | 29 | 09JUL2013 - 15APR2014 | 4 | 4.425 | 0.486 | 3.7 | 4.15 | 4.65 | 4.7 | 4.7 | 0 | 0 | 0.0% |
| C123SR84 | DIS. MG | mg/L | 31 | 09JUL2013 - 15APR2014 | 4 | 10.700 | 0.956 | 9.3 | 10.1 | 11.05 | 11.3 | 11.4 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C123SR84 | DIS. NA | mg/L | 28 | 09JUL2013 - 15APR2014 | 4 | 41.600 | 7.545 | 31.8 | 35.9 | 42.7 | 47.3 | 49.2 | 0 | 0 | 0.0% |
| C123SR84 | TOT. CL | mg/L | 32 | 09JUL2013 - 15APR2014 | 4 | 64.350 | 12.046 | 47.7 | 56.25 | 66.8 | 72.45 | 76.1 | 0 | 0 | 0.0% |
| C123SR84 | TOT. SO4 | mg/L | 33 | 09JUL2013 - 15APR2014 | 4 | 10.075 | 6.840 | 4 | 4.7 | 8.7 | 15.45 | 18.9 | 0 | 0 | 0.0% |
| G94B | DO | mg/L | 8 | 14MAY2013 - 15APR2014 | 14 | 3.892 | 1.658 | 1.12 | 2.43 | 4.08 | 5.19 | 6.22 | 0 | 5 | 35.7% |
| G94B | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 15APR2014 | 14 | 718.907 | 237.453 | 272 | 574 | 810.5 | 896 | 1032 | 0 | 0 | 0.0% |
| G94B | PH | UNITS | 10 | 14MAY2013 - 15APR2014 | 14 | 7.400 | 0.235 | 6.9 | 7.3 | 7.4 | 7.5 | 7.8 | 0 | 0 | 0.0% |
| G94B | TURBIDITY | NTU | 12 | 14MAY2013 - 15APR2014 | 14 | 2.043 | 1.040 | 1.1 | 1.3 | 1.75 | 2.4 | 4.8 | 0 | 0 | 0.0% |
| G94B | TEMP | CENT | 7 | 14MAY2013 - 15APR2014 | 14 | 25.229 | 3.359 | 18.8 | 22.8 | 25.7 | 27.7 | 29.4 | 0 | 0 | 0.0% |
| G94B | TN | mg N/L | 80 | 14MAY2013 - 15APR2014 | 14 | 1.516 | 0.314 | 0.992 | 1.286 | 1.5295 | 1.76 | 2.049 | 0 | 0 | 0.0% |
| G94B | NOX | mg N/L | 18;180 | 14MAY2013 - 15APR2014 | 14 | 0.049 | 0.105 | 0.005 | 0.005 | 0.014 | 0.046 | 0.409 | 0 | 0 | 0.0% |
| G94B | TKN | mg N/L | 21 | 14MAY2013 - 15APR2014 | 14 | 1.469 | 0.278 | 0.98 | 1.27 | 1.505 | 1.64 | 1.89 | 0 | 0 | 0.0% |
| G94B | TP | mg P/L | 25 | 14MAY2013 - 15APR2014 | 14 | 0.032 | 0.012 | 0.018 | 0.02 | 0.029 | 0.039 | 0.06 | 0 | 0 | 0.0% |
| G94B | TOT. SO4 | mg/L | 33 | 09JUL2013 - 15APR2014 | 4 | 41.000 | 35.412 | 11 | 11 | 36.5 | 71 | 80 | 0 | 0 | 0.0% |
| S31 | DO | mg/L | 8 | 13MAY2013 - 14APR2014 | 18 | 2.685 | 0.854 | 1.32 | 1.88 | 2.88 | 3.35 | 4.21 | 0 | 14 | 77.8% |
| S31 | FLDCOND. | UMHOS/CM | 9 | 13MAY2013 - 14APR2014 | 18 | 689.228 | 49.519 | 592 | 665.7 | 699.15 | 714 | 790 | 0 | 0 | 0.0% |
| S31 | PH | UNITS | 10 | 13MAY2013 - 14APR2014 | 18 | 7.422 | 0.163 | 7.1 | 7.3 | 7.4 | 7.5 | 7.8 | 0 | 0 | 0.0% |
| S31 | TURBIDITY | NTU | 12 | 13MAY2013 - 14APR2014 | 20 | 1.840 | 2.528 | 0.5 | 0.6 | 1.15 | 1.5 | 11 | 0 | 0 | 0.0% |
| S31 | HARDNESS | mg/L CACO3 | 35 | 08JUL2013 - 14APR2014 | 4 | 237.300 | 15.208 | 217.3 | 225.5 | 240.85 | 249.1 | 250.2 | 0 | 0 | 0.0% |
| S31 | TEMP | CENT | 7 | 13MAY2013 - 14APR2014 | 18 | 26.356 | 3.037 | 20.2 | 23.7 | 27.5 | 28.2 | 30.3 | 0 | 0 | 0.0% |
| S31 | TN | mg N/L | 80 | 13MAY2013 - 14APR2014 | 18 | 1.309 | 0.185 | 1.077 | 1.169 | 1.3025 | 1.479 | 1.693 | 0 | 0 | 0.0% |
| S31 | NOX | mg N/L | 18;180 | 13MAY2013 - 14APR2014 | 16 | 0.036 | 0.027 | 0.005 | 0.022 | 0.029 | 0.041 | 0.109 | 0 | 0 | 0.0% |
| S31 | TKN | mg N/L | 21 | 13MAY2013 - 14APR2014 | 18 | 1.277 | 0.177 | 1.05 | 1.1 | 1.255 | 1.45 | 1.65 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S31 | OPO4 | mg P/L | 23 | 13MAY2013 - 14APR2014 | 18 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S31 | TP | mg P/L | 25 | 13MAY2013 - 14APR2014 | 18 | 0.011 | 0.003 | 0.006 | 0.009 | 0.01 | 0.013 | 0.017 | 0 | 0 | 0.0% |
| S31 | DIS. CA | mg/L | 30 | 08JUL2013 - 14APR2014 | 4 | 69.575 | 9.253 | 58.2 | 62.05 | 71.2 | 77.1 | 77.7 | 0 | 0 | 0.0% |
| S31 | DIS. K | mg/L | 29 | 08JUL2013 - 14APR2014 | 4 | 4.550 | 0.661 | 3.9 | 4 | 4.5 | 5.1 | 5.3 | 0 | 0 | 0.0% |
| S31 | DIS. MG | mg/L | 31 | 08JUL2013 - 14APR2014 | 4 | 15.425 | 2.014 | 13.6 | 13.7 | 15.3 | 17.15 | 17.5 | 0 | 0 | 0.0% |
| S31 | DIS. NA | mg/L | 28 | 08JUL2013 - 14APR2014 | 4 | 54.500 | 2.743 | 51.5 | 52.35 | 54.35 | 56.65 | 57.8 | 0 | 0 | 0.0% |
| S31 | TOT. CL | mg/L | 32 | 08JUL2013 - 14APR2014 | 6 | 56.050 | 39.193 | 5.3 | 6.3 | 77.1 | 81.4 | 89.1 | 0 | 0 | 0.0% |
| S31 | TOT. SO4 | mg/L | 33 | 08JUL2013 - 14APR2014 | 4 | 16.250 | 13.028 | 5.2 | 5.25 | 14.5 | 27.25 | 30.8 | 0 | 0 | 0.0% |
| S31 | CA_I | mg/L | 188 | 17SEP2013 - 28JAN2014 | 2 | 2.900 | 2.263 | 1.3 | 1.3 | 2.9 | 4.5 | 4.5 | 0 | 0 | 0.0% |
| S38 | DO | mg/L | 8 | 14MAY2013 - 29APR2014 | 26 | 2.762 | 1.180 | 1.03 | 2.05 | 2.5 | 3.62 | 5.44 | 0 | 19 | 73.1% |
| S38 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 29APR2014 | 26 | 589.185 | 175.393 | 289 | 474 | 551.5 | 700 | 937 | 0 | 0 | 0.0% |
| S38 | PH | UNITS | 10 | 14MAY2013 - 29APR2014 | 26 | 7.315 | 0.187 | 6.8 | 7.2 | 7.4 | 7.4 | 7.6 | 0 | 0 | 0.0% |
| S38 | TURBIDITY | NTU | 12 | 14MAY2013 - 29APR2014 | 26 | 0.854 | 0.318 | 0.4 | 0.7 | 0.8 | 1 | 1.9 | 0 | 0 | 0.0% |
| S38 | TSS | mg/L | 16 | 14MAY2013 - 29APR2014 | 26 | 3.000 | 0.000 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.0% |
| S38 | HARDNESS | mg/L CACO3 | 35 | 14MAY2013 - 29APR2014 | 26 | 154.419 | 42.542 | 75.6 | 122.6 | 152.15 | 182.5 | 239.4 | 0 | 0 | 0.0% |
| S38 | TEMP | CENT | 7 | 14MAY2013 - 29APR2014 | 26 | 25.281 | 3.523 | 16.7 | 22.6 | 25.7 | 28.1 | 30 | 0 | 0 | 0.0% |
| S38 | ALKALINITY | mg/L | 67 | 14MAY2013 - 29APR2014 | 26 | 134.808 | 37.158 | 72 | 108 | 132.5 | 164 | 209 | 0 | 0 | 0.0% |
| S38 | TN | mg N/L | 80 | 14MAY2013 - 29APR2014 | 26 | 1.341 | 0.345 | 0.86 | 1.05 | 1.28 | 1.518 | 2.157 | 0 | 0 | 0.0% |
| S38 | NOX | mg N/L | 18;180 | 14MAY2013 - 29APR2014 | 26 | 0.007 | 0.004 | 0.005 | 0.005 | 0.005 | 0.007 | 0.024 | 0 | 0 | 0.0% |
| S38 | NH4 | mg N/L | 20 | 14MAY2013 - 29APR2014 | 26 | 0.027 | 0.023 | 0.01 | 0.014 | 0.0195 | 0.026 | 0.1 | 0 | 0 | 0.0% |
| S38 | UN-IONIZED AMMONIA | mg/L | NONE | 14MAY2013 - 29APR2014 | 26 | 0.000 | 0.000 | 9.21163E-05 | 0.000199444 | 0.000280131 | 0.000474679 | 0.001735259 | 0 | 0 | 0.0% |
| S38 | NNH4 | mg N/L | 92 | 14MAY2013 - 29APR2014 | 26 | 0.031 | 0.027 | 0.01 | 0.015 | 0.0205 | 0.028 | 0.109 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S38 | ORGN | mg N/L | 79 | 14MAY2013 - 29APR2014 | 26 | 1.310 | 0.324 | 0.838 | 1.035 | 1.266 | 1.459 | 2.058 | 0 | 0 | 0.0% |
| S38 | TKN | mg N/L | 21 | 14MAY2013 - 29APR2014 | 26 | 1.337 | 0.341 | 0.86 | 1.05 | 1.28 | 1.51 | 2.14 | 0 | 0 | 0.0% |
| S38 | OPO4 | mg P/L | 23 | 14MAY2013 - 29APR2014 | 26 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S38 | TP | mg P/L | 25 | 14MAY2013 - 29APR2014 | 26 | 0.008 | 0.003 | 0.005 | 0.006 | 0.007 | 0.009 | 0.018 | 0 | 0 | 0.0% |
| S38 | DIS. CA | mg/L | 30 | 14MAY2013 - 29APR2014 | 26 | 40.396 | 9.661 | 21.1 | 35 | 39.75 | 48.1 | 58.2 | 0 | 0 | 0.0% |
| S38 | DIS. K | mg/L | 29 | 14MAY2013 - 29APR2014 | 26 | 4.923 | 1.514 | 2.6 | 4.2 | 4.75 | 6 | 7.9 | 0 | 0 | 0.0% |
| S38 | DIS. MG | mg/L | 31 | 14MAY2013 - 29APR2014 | 26 | 13.015 | 4.630 | 5.5 | 9.1 | 12.65 | 16 | 22.9 | 0 | 0 | 0.0% |
| S38 | DIS. NA | mg/L | 28 | 14MAY2013 - 29APR2014 | 26 | 57.688 | 19.590 | 28 | 43 | 55.35 | 72.9 | 101.1 | 0 | 0 | 0.0% |
| S38 | TOT. CL | mg/L | 32 | 14MAY2013 - 29APR2014 | 26 | 88.119 | 34.441 | 39.4 | 62.3 | 82.25 | 110 | 169 | 0 | 0 | 0.0% |
| S38 | TOT. SO4 | mg/L | 33 | 14MAY2013 - 29APR2014 | 26 | 17.808 | 7.046 | 5.8 | 12.6 | 16.8 | 20.8 | 35.6 | 0 | 0 | 0.0% |
| S38 | DIS. SILICA | mg/L | 27 | 14MAY2013 - 29APR2014 | 26 | 11.515 | 3.627 | 3.61 | 9.03 | 11.55 | 14.9 | 16.4 | 0 | 0 | 0.0% |
| S38 | TOT. FE | mg/L | 177 | 09JUL2013 - 15APR2014 | 4 | 0.012 | 0.006 | 0.006 | 0.0075 | 0.0125 | 0.017 | 0.018 | 0 | 0 | 0.0% |
| S38 | DIS. KJEL N | mg N/L | 22 | 14MAY2013 - 29APR2014 | 26 | 1.278 | 0.322 | 0.83 | 1.02 | 1.235 | 1.45 | 2.02 | 0 | 0 | 0.0% |
| S38 | DIS. ORGAN. C | mg/L | 89;181 | 14MAY2013 - 29APR2014 | 26 | 22.719 | 5.578 | 14.3 | 19.1 | 21.45 | 25.9 | 34.8 | 0 | 0 | 0.0% |
| S38 | TOT. DIS. P | mg P/L | 26 | 14MAY2013 - 29APR2014 | 26 | 0.004 | 0.001 | 0.002 | 0.003 | 0.003 | 0.004 | 0.009 | 0 | 0 | 0.0% |
| S38 | TOT. ORGAN. C | mg/L | 100 | 14MAY2013 - 29APR2014 | 26 | 22.900 | 5.524 | 14.3 | 19.2 | 22 | 26.2 | 35.4 | 0 | 0 | 0.0% |
| S39 | DO | mg/L | 8 | 14MAY2013 - 29APR2014 | 24 | 5.156 | 1.860 | 1.62 | 3.845 | 5.24 | 6.895 | 7.86 | 0 | 3 | 12.5% |
| S39 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 29APR2014 | 24 | 619.875 | 199.703 | 244.6 | 463.5 | 684 | 775 | 958 | 0 | 0 | 0.0% |
| S39 | PH | UNITS | 10 | 14MAY2013 - 29APR2014 | 24 | 7.563 | 0.309 | 6.8 | 7.4 | 7.65 | 7.8 | 7.9 | 0 | 0 | 0.0% |
| S39 | TURBIDITY | NTU | 12 | 14MAY2013 - 29APR2014 | 24 | 1.317 | 0.872 | 0.7 | 0.9 | 1.1 | 1.2 | 4.7 | 0 | 0 | 0.0% |
| S39 | TSS | mg/L | 16 | 14MAY2013 - 29APR2014 | 23 | 3.565 | 1.927 | 3 | 3 | 3 | 3 | 11 | 0 | 0 | 0.0% |
| S39 | HARDNESS | mg/L CACO3 | 35 | 14MAY2013 - 29APR2014 | 23 | 162.143 | 59.657 | 65 | 114.2 | 167.1 | 214.4 | 303 | 0 | 0 | 0.0% |
| S39 | TEMP | CENT | 7 | 14MAY2013 - 29APR2014 | 24 | 25.950 | 3.223 | 18.7 | 23.25 | 27.2 | 28.75 | 30.5 | 0 | 0 | 0.0% |
| S39 | ALKALINITY | mg/L | 67 | 14MAY2013 - 29APR2014 | 23 | 126.522 | 38.219 | 61 | 92 | 136 | 162 | 196 | 0 | 0 | 0.0% |
| S39 | TN | mg N/L | 80 | 14MAY2013 - 29APR2014 | 24 | 1.334 | 0.215 | 0.99 | 1.2075 | 1.327 | 1.4375 | 1.94 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S39 | NOX | mg N/L | 18;180 | 14MAY2013 - 29APR2014 | 24 | 0.021 | 0.023 | 0.005 | 0.009 | 0.013 | 0.019 | 0.1 | 0 | 0 | 0.0% |
| S39 | NH4 | mg N/L | 20 | 14MAY2013 - 29APR2014 | 23 | 0.027 | 0.014 | 0.01 | 0.019 | 0.022 | 0.03 | 0.067 | 0 | 0 | 0.0% |
| S39 | UN-IONIZED AMMONIA | mg/L | NONE | 14MAY2013 - 29APR2014 | 23 | 0.001 | 0.000 | 0.000134661 | 0.000406705 | 0.000835066 | 0.001016493 | 0.002023019 | 0 | 0 | 0.0% |
| S39 | NNH4 | mg N/L | 92 | 14MAY2013 - 29APR2014 | 23 | 0.048 | 0.033 | 0.017 | 0.03 | 0.034 | 0.066 | 0.127 | 0 | 0 | 0.0% |
| S39 | ORGN | mg N/L | 79 | 14MAY2013 - 29APR2014 | 23 | 1.284 | 0.222 | 0.957 | 1.166 | 1.289 | 1.4 | 1.902 | 0 | 0 | 0.0% |
| S39 | TKN | mg N/L | 21 | 14MAY2013 - 29APR2014 | 24 | 1.314 | 0.215 | 0.98 | 1.2 | 1.31 | 1.42 | 1.92 | 0 | 0 | 0.0% |
| S39 | OPO4 | mg P/L | 23 | 14MAY2013 - 29APR2014 | 23 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.008 | 0 | 0 | 0.0% |
| S39 | TP | mg P/L | 25 | 14MAY2013 - 29APR2014 | 24 | 0.019 | 0.007 | 0.011 | 0.013 | 0.017 | 0.024 | 0.037 | 0 | 0 | 0.0% |
| S39 | DIS. CA | mg/L | 30 | 14MAY2013 - 29APR2014 | 23 | 43.948 | 14.650 | 20.1 | 32.8 | 45.4 | 56.4 | 77 | 0 | 0 | 0.0% |
| S39 | DIS. K | mg/L | 29 | 14MAY2013 - 29APR2014 | 23 | 5.396 | 2.234 | 1.7 | 3.5 | 5.8 | 6.9 | 9.2 | 0 | 0 | 0.0% |
| S39 | DIS. MG | mg/L | 31 | 14MAY2013 - 29APR2014 | 23 | 12.722 | 5.910 | 3.6 | 7.1 | 12.1 | 17.7 | 26.9 | 0 | 0 | 0.0% |
| S39 | DIS. NA | mg/L | 28 | 14MAY2013 - 29APR2014 | 23 | 59.557 | 21.956 | 22.1 | 37.3 | 61.7 | 76.3 | 98.1 | 0 | 0 | 0.0% |
| S39 | TOT. CL | mg/L | 32 | 14MAY2013 - 29APR2014 | 24 | 91.388 | 32.393 | 32 | 59.15 | 102.25 | 113.5 | 143 | 0 | 0 | 0.0% |
| S39 | TOT. SO4 | mg/L | 33 | 14MAY2013 - 29APR2014 | 24 | 32.883 | 18.754 | 6.2 | 19.7 | 29.6 | 46.05 | 75.1 | 0 | 0 | 0.0% |
| S39 | DIS. SILICA | mg/L | 27 | 14MAY2013 - 29APR2014 | 23 | 10.077 | 5.857 | 3.07 | 5.19 | 7.59 | 15 | 24.2 | 0 | 0 | 0.0% |
| S39 | TOT. FE | mg/L | 177 | 09JUL2013 - 15APR2014 | 4 | 0.024 | 0.035 | 0.006 | 0.006 | 0.007 | 0.042 | 0.076 | 0 | 0 | 0.0% |
| S39 | DIS. KJEL N | mg N/L | 22 | 14MAY2013 - 29APR2014 | 23 | 1.212 | 0.250 | 0.79 | 0.99 | 1.2 | 1.38 | 1.85 | 0 | 0 | 0.0% |
| S39 | DIS. ORGAN. C | mg/L | 89;181 | 14MAY2013 - 29APR2014 | 23 | 21.322 | 4.579 | 12.6 | 17.9 | 22.2 | 25 | 30.4 | 0 | 0 | 0.0% |
| S39 | TOT. DIS. P | mg P/L | 26 | 14MAY2013 - 29APR2014 | 23 | 0.008 | 0.003 | 0.004 | 0.006 | 0.008 | 0.012 | 0.015 | 0 | 0 | 0.0% |
| S39 | TOT. ORGAN. C | mg/L | 100 | 14MAY2013 - 29APR2014 | 23 | 21.617 | 4.704 | 12.4 | 17.7 | 22.6 | 25.4 | 30.7 | 0 | 0 | 0.0% |
| S197 | DO | mg/L | 8 | 14MAY2013 - 14APR2014 | 6 | 7.373 | 1.680 | 4.08 | 7.6 | 7.735 | 8.24 | 8.85 | 0 | 0 | 0.0% |
| S197 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 14APR2014 | 6 | 490.667 | 16.705 | 460 | 488 | 493.5 | 501 | 508 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S197 | PH | UNITS | 10 | 14MAY2013 - 14APR2014 | 6 | 7.833 | 0.207 | 7.6 | 7.7 | 7.8 | 7.9 | 8.2 | 0 | 0 | 0.0% |
| S197 | TURBIDITY | NTU | 12 | 14MAY2013 - 14APR2014 | 5 | 0.960 | 0.351 | 0.6 | 0.7 | 1 | 1 | 1.5 | 0 | 0 | 0.0% |
| S197 | TSS | mg/L | 16 | 14MAY2013 - 14APR2014 | 6 | 3.000 | 0.000 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.0% |
| S197 | HARDNESS | mg/L CACO3 | 35 | 14MAY2013 - 14APR2014 | 6 | 184.400 | 15.287 | 163.5 | 170.6 | 185.45 | 199 | 202.4 | 0 | 0 | 0.0% |
| S197 | TEMP | CENT | 7 | 14MAY2013 - 14APR2014 | 6 | 26.100 | 2.784 | 21.1 | 25.5 | 26.35 | 28.4 | 28.9 | 0 | 0 | 0.0% |
| S197 | TN | mg N/L | 80 | 14MAY2013 - 14APR2014 | 6 | 0.531 | 0.063 | 0.43 | 0.476 | 0.559 | 0.576 | 0.585 | 0 | 0 | 0.0% |
| S197 | NOX | mg N/L | 18;180 | 14MAY2013 - 14APR2014 | 6 | 0.062 | 0.053 | 0.005 | 0.005 | 0.0585 | 0.116 | 0.127 | 0 | 0 | 0.0% |
| S197 | TKN | mg N/L | 21 | 14MAY2013 - 14APR2014 | 6 | 0.470 | 0.057 | 0.43 | 0.43 | 0.45 | 0.48 | 0.58 | 0 | 0 | 0.0% |
| S197 | OPO4 | mg P/L | 23 | 14MAY2013 - 14APR2014 | 6 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S197 | TP | mg P/L | 25 | 14MAY2013 - 14APR2014 | 6 | 0.005 | 0.001 | 0.003 | 0.004 | 0.0045 | 0.005 | 0.006 | 0 | 0 | 0.0% |
| S197 | DIS. CA | mg/L | 30 | 14MAY2013 - 14APR2014 | 6 | 64.867 | 7.076 | 54.4 | 59.2 | 65.65 | 71.4 | 72.9 | 0 | 0 | 0.0% |
| S197 | DIS. K | mg/L | 29 | 14MAY2013 - 14APR2014 | 6 | 4.267 | 0.344 | 3.8 | 4 | 4.3 | 4.4 | 4.8 | 0 | 0 | 0.0% |
| S197 | DIS. MG | mg/L | 31 | 14MAY2013 - 14APR2014 | 6 | 5.450 | 0.701 | 4.8 | 5 | 5.25 | 5.7 | 6.7 | 0 | 0 | 0.0% |
| S197 | DIS. NA | mg/L | 28 | 14MAY2013 - 14APR2014 | 6 | 26.300 | 3.216 | 21.2 | 25.4 | 25.95 | 28.7 | 30.6 | 0 | 0 | 0.0% |
| S197 | TOT. CL | mg/L | 32 | 14MAY2013 - 14APR2014 | 6 | 42.150 | 4.481 | 36.3 | 40 | 41.25 | 44.8 | 49.3 | 0 | 0 | 0.0% |
| S197 | TOT. SO4 | mg/L | 33 | 14MAY2013 - 14APR2014 | 5 | 6.640 | 1.460 | 4.6 | 5.6 | 7.4 | 7.7 | 7.9 | 0 | 0 | 0.0% |
| S334 | DO | mg/L | 8 | 29APR2014 - 29APR2014 | 1 | 4.720 | | 4.72 | 4.72 | 4.72 | 4.72 | 4.72 | 0 | 0 | 0.0% |
| S334 | FLDCOND. | UMHOS/CM | 9 | 29APR2014 - 29APR2014 | 1 | 660.100 | | 660.1 | 660.1 | 660.1 | 660.1 | 660.1 | 0 | 0 | 0.0% |
| S334 | PH | UNITS | 10 | 29APR2014 - 29APR2014 | 1 | 7.500 | | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 0 | 0 | 0.0% |
| S334 | TEMP | CENT | 7 | 29APR2014 - 29APR2014 | 1 | 28.500 | | 28.5 | 28.5 | 28.5 | 28.5 | 28.5 | 0 | 0 | 0.0% |
| S334 | TP | mg P/L | 25 | 29APR2014 - 29APR2014 | 1 | 0.012 | | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0 | 0 | 0.0% |
| US41-25 | DO | mg/L | 8 | 28MAY2013 - 15APR2014 | 18 | 2.729 | 0.666 | 1.63 | 2.27 | 2.61 | 3.22 | 4.16 | 0 | 11 | 61.1% |
| US41-25 | FLDCOND. | UMHOS/CM | 9 | 28MAY2013 - 15APR2014 | 18 | 320.139 | 69.643 | 231.9 | 258.4 | 306.8 | 393.2 | 436.1 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US41-25 | PH | UNITS | 10 | 28MAY2013 - 15APR2014 | 17 | 7.071 | 0.092 | 6.9 | 7 | 7.1 | 7.1 | 7.2 | 0 | 0 | 0.0% |
| US41-25 | TURBIDITY | NTU | 12 | 09JUL2013 - 15APR2014 | 6 | 3.783 | 5.071 | 0.6 | 1 | 2.15 | 2.8 | 14 | 0 | 0 | 0.0% |
| US41-25 | TSS | mg/L | 16 | 28MAY2013 - 15APR2014 | 18 | 3.111 | 0.323 | 3 | 3 | 3 | 3 | 4 | 0 | 0 | 0.0% |
| US41-25 | HARDNESS | mg/L CACO3 | 35 | 28MAY2013 - 15APR2014 | 18 | 145.794 | 39.372 | 99.8 | 111.2 | 129.15 | 179.2 | 207.6 | 0 | 0 | 0.0% |
| US41-25 | TEMP | CENT | 7 | 28MAY2013 - 15APR2014 | 18 | 25.994 | 3.655 | 17.3 | 23.6 | 27.05 | 29 | 30.6 | 0 | 0 | 0.0% |
| US41-25 | TN | mg N/L | 80 | 28MAY2013 - 15APR2014 | 18 | 0.745 | 0.126 | 0.587 | 0.65 | 0.6895 | 0.857 | 1.012 | 0 | 0 | 0.0% |
| US41-25 | NOX | mg N/L | 18;180 | 28MAY2013 - 15APR2014 | 18 | 0.018 | 0.016 | 0.005 | 0.006 | 0.014 | 0.024 | 0.057 | 0 | 0 | 0.0% |
| US41-25 | TKN | mg N/L | 21 | 28MAY2013 - 15APR2014 | 18 | 0.728 | 0.118 | 0.58 | 0.65 | 0.685 | 0.8 | 1 | 0 | 0 | 0.0% |
| US41-25 | OPO4 | mg P/L | 23 | 28MAY2013 - 15APR2014 | 18 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 | 0 | 0 | 0.0% |
| US41-25 | TP | mg P/L | 25 | 28MAY2013 - 15APR2014 | 18 | 0.014 | 0.008 | 0.006 | 0.008 | 0.013 | 0.016 | 0.036 | 0 | 0 | 0.0% |
| US41-25 | DIS. CA | mg/L | 30 | 28MAY2013 - 15APR2014 | 18 | 53.806 | 15.190 | 35.9 | 39.9 | 47.2 | 66.9 | 77.8 | 0 | 0 | 0.0% |
| US41-25 | DIS. K | mg/L | 29 | 28MAY2013 - 15APR2014 | 18 | 0.644 | 0.209 | 0.2 | 0.5 | 0.7 | 0.8 | 1 | 0 | 0 | 0.0% |
| US41-25 | DIS. MG | mg/L | 31 | 28MAY2013 - 15APR2014 | 18 | 2.772 | 0.529 | 1.8 | 2.4 | 2.8 | 3.2 | 3.6 | 0 | 0 | 0.0% |
| US41-25 | DIS. NA | mg/L | 28 | 28MAY2013 - 15APR2014 | 18 | 11.294 | 2.313 | 7.6 | 9.7 | 11.25 | 13.7 | 14.5 | 0 | 0 | 0.0% |
| US41-25 | TOT. CL | mg/L | 32 | 28MAY2013 - 15APR2014 | 20 | 15.565 | 5.241 | 1.5 | 12.35 | 16 | 20 | 21.6 | 0 | 0 | 0.0% |
| US41-25 | TOT. SO4 | mg/L | 33 | 09JUL2013 - 15APR2014 | 4 | 0.175 | 0.150 | 0.1 | 0.1 | 0.1 | 0.25 | 0.4 | 0 | 0 | 0.0% |
| US41-25 | CA_I | mg/L | 188 | 17SEP2013 - 28JAN2014 | 2 | 3.495 | 3.967 | 0.69 | 0.69 | 3.495 | 6.3 | 6.3 | 0 | 0 | 0.0% |
| S344 | DO | mg/L | 8 | 19JUN2013 - 24FEB2014 | 4 | 2.538 | 1.035 | 1.16 | 1.76 | 2.74 | 3.315 | 3.51 | 0 | 4 | 100.0% |
| S344 | FLDCOND. | UMHOS/CM | 9 | 19JUN2013 - 24FEB2014 | 4 | 293.750 | 40.451 | 252 | 265.5 | 287.5 | 322 | 348 | 0 | 0 | 0.0% |
| S344 | PH | UNITS | 10 | 19JUN2013 - 24FEB2014 | 4 | 7.100 | 0.082 | 7 | 7.05 | 7.1 | 7.15 | 7.2 | 0 | 0 | 0.0% |
| S344 | TURBIDITY | NTU | 12 | 19JUN2013 - 10APR2014 | 5 | 2.280 | 2.325 | 0.9 | 1 | 1.4 | 1.7 | 6.4 | 0 | 0 | 0.0% |
| S344 | TEMP | CENT | 7 | 19JUN2013 - 24FEB2014 | 4 | 25.625 | 3.792 | 22 | 22.45 | 25.3 | 28.8 | 29.9 | 0 | 0 | 0.0% |
| S344 | TN | mg N/L | 80 | 19JUN2013 - 10APR2014 | 5 | 1.058 | 0.270 | 0.828 | 0.88 | 0.904 | 1.23 | 1.45 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S344 | NOX | mg N/L | 18;180 | 19SEP2013 - 10APR2014 | 4 | 0.009 | 0.004 | 0.005 | 0.0065 | 0.009 | 0.012 | 0.014 | 0 | 0 | 0.0% |
| S344 | TKN | mg N/L | 21 | 19JUN2013 - 10APR2014 | 5 | 1.052 | 0.272 | 0.82 | 0.88 | 0.89 | 1.22 | 1.45 | 0 | 0 | 0.0% |
| S344 | TP | mg P/L | 25 | 19JUN2013 - 10APR2014 | 5 | 0.034 | 0.031 | 0.008 | 0.015 | 0.017 | 0.044 | 0.084 | 0 | 0 | 0.0% |
| S344 | TOT. SO4 | mg/L | 33 | 19JUN2013 - 10APR2014 | 5 | 0.120 | 0.045 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0 | 0 | 0.0% |
| S177 | DO | mg/L | 8 | 14MAY2013 - 29APR2014 | 42 | 3.451 | 1.756 | 0.65 | 2.27 | 3.255 | 4.13 | 8.2 | 0 | 21 | 50.0% |
| S177 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 29APR2014 | 42 | 525.738 | 18.234 | 506 | 516 | 521 | 528 | 608 | 0 | 0 | 0.0% |
| S177 | PH | UNITS | 10 | 14MAY2013 - 29APR2014 | 42 | 7.424 | 0.185 | 6.9 | 7.3 | 7.4 | 7.5 | 7.9 | 0 | 0 | 0.0% |
| S177 | TURBIDITY | NTU | 12 | 14MAY2013 - 15APR2014 | 7 | 4.857 | 5.950 | 0.6 | 1.1 | 1.3 | 13 | 14 | 0 | 0 | 0.0% |
| S177 | TSS | mg/L | 16 | 14MAY2013 - 29APR2014 | 42 | 3.000 | 0.000 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.0% |
| S177 | HARDNESS | mg/L CACO3 | 35 | 14MAY2013 - 29APR2014 | 42 | 194.279 | 8.679 | 180.9 | 188.7 | 192.85 | 196.8 | 227.9 | 0 | 0 | 0.0% |
| S177 | TEMP | CENT | 7 | 14MAY2013 - 29APR2014 | 42 | 26.329 | 1.012 | 23.3 | 25.8 | 26.55 | 26.9 | 28 | 0 | 0 | 0.0% |
| S177 | TN | mg N/L | 80 | 14MAY2013 - 29APR2014 | 42 | 0.593 | 0.116 | 0.462 | 0.535 | 0.565 | 0.59 | 1.06 | 0 | 0 | 0.0% |
| S177 | NOX | mg N/L | 18;180 | 14MAY2013 - 29APR2014 | 39 | 0.018 | 0.015 | 0.005 | 0.005 | 0.014 | 0.023 | 0.064 | 0 | 0 | 0.0% |
| S177 | NH4 | mg N/L | 20 | 28MAY2013 - 29APR2014 | 40 | 0.040 | 0.026 | 0.005 | 0.019 | 0.042 | 0.056 | 0.105 | 0 | 0 | 0.0% |
| S177 | UN-IONIZED AMMONIA | mg/L | NONE | 14MAY2013 - 29APR2014 | 40 | 0.001 | 0.000 | 4.55942E-05 | 0.000402518 | 0.000708792 | 0.001059253 | 0.002279774 | 0 | 0 | 0.0% |
| S177 | NNH4 | mg N/L | 92 | 28MAY2013 - 29APR2014 | 37 | 0.057 | 0.029 | 0.005 | 0.032 | 0.06 | 0.079 | 0.111 | 0 | 0 | 0.0% |
| S177 | ORGN | mg N/L | 79 | 04JUN2013 - 29APR2014 | 38 | 0.540 | 0.109 | 0.414 | 0.49 | 0.5095 | 0.541 | 0.982 | 0 | 0 | 0.0% |
| S177 | TKN | mg N/L | 21 | 14MAY2013 - 29APR2014 | 40 | 0.581 | 0.114 | 0.44 | 0.52 | 0.55 | 0.585 | 1.06 | 0 | 0 | 0.0% |
| S177 | OPO4 | mg P/L | 23 | 14MAY2013 - 29APR2014 | 42 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S177 | TP | mg P/L | 25 | 14MAY2013 - 29APR2014 | 42 | 0.006 | 0.002 | 0.003 | 0.004 | 0.005 | 0.007 | 0.014 | 0 | 0 | 0.0% |
| S177 | DIS. CA | mg/L | 30 | 14MAY2013 - 29APR2014 | 42 | 66.898 | 2.776 | 62.6 | 65.1 | 66.45 | 68.2 | 75.8 | 0 | 0 | 0.0% |
| S177 | DIS. K | mg/L | 29 | 14MAY2013 - 29APR2014 | 42 | 3.052 | 0.380 | 2.4 | 2.8 | 3 | 3.3 | 4.3 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S177 | DIS. MG | mg/L | 31 | 14MAY2013 - 29APR2014 | 42 | 6.614 | 0.755 | 5.1 | 6.2 | 6.5 | 6.9 | 9.4 | 0 | 0 | 0.0% |
| S177 | DIS. NA | mg/L | 28 | 14MAY2013 - 29APR2014 | 42 | 30.926 | 2.422 | 25.7 | 29.5 | 30.8 | 31.3 | 39.9 | 0 | 0 | 0.0% |
| S177 | TOT. CL | mg/L | 32 | 14MAY2013 - 29APR2014 | 44 | 46.186 | 8.927 | 9.9 | 46.2 | 47.4 | 48.4 | 66.4 | 0 | 0 | 0.0% |
| S177 | TOT. SO4 | mg/L | 33 | 14MAY2013 - 15APR2014 | 5 | 1.480 | 0.084 | 1.4 | 1.4 | 1.5 | 1.5 | 1.6 | 0 | 0 | 0.0% |
| S177 | CA_I | mg/L | 188 | 16SEP2013 - 27JAN2014 | 2 | 3.400 | 0.424 | 3.1 | 3.1 | 3.4 | 3.7 | 3.7 | 0 | 0 | 0.0% |
| S178 | DO | mg/L | 8 | 14MAY2013 - 29APR2014 | 35 | 4.293 | 1.875 | 1.24 | 2.67 | 3.99 | 6.04 | 8.69 | 0 | 14 | 40.0% |
| S178 | FLDCOND. | UMHOS/CM | 9 | 14MAY2013 - 29APR2014 | 35 | 528.600 | 45.306 | 420 | 498 | 538 | 567 | 604 | 0 | 0 | 0.0% |
| S178 | PH | UNITS | 10 | 14MAY2013 - 29APR2014 | 35 | 7.406 | 0.288 | 6.7 | 7.2 | 7.4 | 7.6 | 8 | 0 | 0 | 0.0% |
| S178 | TURBIDITY | NTU | 12 | 14MAY2013 - 14APR2014 | 7 | 6.129 | 7.978 | 0.6 | 0.6 | 1.9 | 15 | 20 | 0 | 0 | 0.0% |
| S178 | TSS | mg/L | 16 | 14MAY2013 - 29APR2014 | 35 | 3.543 | 1.597 | 3 | 3 | 3 | 3 | 11 | 0 | 0 | 0.0% |
| S178 | TEMP | CENT | 7 | 14MAY2013 - 29APR2014 | 35 | 24.789 | 2.610 | 18.7 | 22.8 | 25.1 | 26.8 | 29.2 | 0 | 0 | 0.0% |
| S178 | TN | mg N/L | 80 | 14MAY2013 - 29APR2014 | 35 | 0.658 | 0.249 | 0.38 | 0.503 | 0.577 | 0.719 | 1.636 | 0 | 0 | 0.0% |
| S178 | NOX | mg N/L | 18;180 | 14MAY2013 - 29APR2014 | 31 | 0.127 | 0.248 | 0.005 | 0.018 | 0.028 | 0.119 | 1.146 | 0 | 0 | 0.0% |
| S178 | NH4 | mg N/L | 20 | 04JUN2013 - 29APR2014 | 33 | 0.042 | 0.027 | 0.01 | 0.023 | 0.037 | 0.058 | 0.12 | 0 | 0 | 0.0% |
| S178 | UN-IONIZED AMMONIA | mg/L | NONE | 14MAY2013 - 29APR2014 | 33 | 0.001 | 0.002 | 5.55614E-05 | 0.000241226 | 0.000445807 | 0.00130551 | 0.00613956 | 0 | 0 | 0.0% |
| S178 | NNH4 | mg N/L | 92 | 04JUN2013 - 29APR2014 | 29 | 0.175 | 0.251 | 0.027 | 0.057 | 0.108 | 0.166 | 1.183 | 0 | 0 | 0.0% |
| S178 | ORGN | mg N/L | 79 | 04JUN2013 - 29APR2014 | 33 | 0.500 | 0.141 | 0.345 | 0.396 | 0.461 | 0.561 | 0.979 | 0 | 0 | 0.0% |
| S178 | TKN | mg N/L | 21 | 14MAY2013 - 29APR2014 | 35 | 0.545 | 0.157 | 0.37 | 0.43 | 0.51 | 0.67 | 1.05 | 0 | 0 | 0.0% |
| S178 | OPO4 | mg P/L | 23 | 14MAY2013 - 29APR2014 | 35 | 0.002 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 | 0.005 | 0 | 0 | 0.0% |
| S178 | TP | mg P/L | 25 | 14MAY2013 - 29APR2014 | 35 | 0.016 | 0.009 | 0.006 | 0.01 | 0.014 | 0.018 | 0.045 | 0 | 0 | 0.0% |
| S178 | DIS. CA | mg/L | 30 | 14MAY2013 - 29APR2014 | 35 | 68.931 | 11.901 | 40.6 | 59.8 | 69.9 | 78.8 | 84.6 | 0 | 0 | 0.0% |
| S178 | DIS. K | mg/L | 29 | 14MAY2013 - 29APR2014 | 35 | 12.560 | 3.262 | 4.6 | 10.6 | 13.1 | 14.4 | 18.5 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S178 | DIS. MG | mg/L | 31 | 14MAY2013 - 29APR2014 | 35 | 5.657 | 0.289 | 5.1 | 5.5 | 5.6 | 5.8 | 6.3 | 0 | 0 | 0.0% |
| S178 | DIS. NA | mg/L | 28 | 14MAY2013 - 29APR2014 | 35 | 25.283 | 2.764 | 19.6 | 23.6 | 24.2 | 25.9 | 31.5 | 0 | 0 | 0.0% |
| S178 | TOT. CL | mg/L | 32 | 14MAY2013 - 29APR2014 | 37 | 42.676 | 8.993 | 7.2 | 42.4 | 44.1 | 46.1 | 53 | 0 | 0 | 0.0% |
| S178 | TOT. SO4 | mg/L | 33 | 14MAY2013 - 14APR2014 | 5 | 28.920 | 9.379 | 16.2 | 25.8 | 29.6 | 30.8 | 42.2 | 0 | 0 | 0.0% |
| S178 | CA_I | mg/L | 188 | 16SEP2013 - 27JAN2014 | 2 | 10.000 | 4.243 | 7 | 7 | 10 | 13 | 13 | 0 | 0 | 0.0% |
| S331-173 | DO | mg/L | 8 | 06MAY2013 - 28APR2014 | 52 | 2.006 | 1.209 | 0.31 | 1.2 | 1.75 | 2.505 | 7.09 | 0 | 45 | 86.5% |
| S331-173 | FLDCOND. | UMHOS/CM | 9 | 06MAY2013 - 28APR2014 | 52 | 570.635 | 51.362 | 515 | 533.5 | 558.5 | 589.5 | 786 | 0 | 0 | 0.0% |
| S331-173 | PH | UNITS | 10 | 06MAY2013 - 28APR2014 | 51 | 7.335 | 0.188 | 7 | 7.2 | 7.3 | 7.4 | 7.9 | 0 | 0 | 0.0% |
| S331-173 | TURBIDITY | NTU | 12 | 08JUL2013 - 14APR2014 | 4 | 1.450 | 0.265 | 1.2 | 1.25 | 1.4 | 1.65 | 1.8 | 0 | 0 | 0.0% |
| S331-173 | TSS | mg/L | 16 | 06MAY2013 - 28APR2014 | 50 | 3.020 | 0.141 | 3 | 3 | 3 | 3 | 4 | 0 | 0 | 0.0% |
| S331-173 | HARDNESS | mg/L CACO3 | 35 | 06MAY2013 - 28APR2014 | 50 | 205.772 | 16.113 | 174.7 | 196.5 | 203 | 216.4 | 256 | 0 | 0 | 0.0% |
| S331-173 | TEMP | CENT | 7 | 06MAY2013 - 28APR2014 | 52 | 25.973 | 2.005 | 21.1 | 24.25 | 26.15 | 27.4 | 29.5 | 0 | 0 | 0.0% |
| S331-173 | TN | mg N/L | 80 | 06MAY2013 - 28APR2014 | 50 | 1.152 | 0.136 | 0.817 | 1.09 | 1.148 | 1.209 | 1.598 | 0 | 0 | 0.0% |
| S331-173 | NOX | mg N/L | 18;180 | 06MAY2013 - 28APR2014 | 45 | 0.029 | 0.031 | 0.005 | 0.013 | 0.02 | 0.03 | 0.198 | 0 | 0 | 0.0% |
| S331-173 | TKN | mg N/L | 21 | 06MAY2013 - 28APR2014 | 50 | 1.126 | 0.129 | 0.74 | 1.08 | 1.125 | 1.19 | 1.42 | 0 | 0 | 0.0% |
| S331-173 | OPO4 | mg P/L | 23 | 06MAY2013 - 28APR2014 | 49 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0 | 0 | 0.0% |
| S331-173 | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 52 | 0.006 | 0.002 | 0.004 | 0.005 | 0.006 | 0.007 | 0.011 | 0 | 0 | 0.0% |
| S331-173 | DIS. CA | mg/L | 30 | 06MAY2013 - 28APR2014 | 50 | 67.350 | 6.679 | 54.4 | 63.6 | 67.7 | 71.8 | 81.3 | 0 | 0 | 0.0% |
| S331-173 | DIS. K | mg/L | 29 | 06MAY2013 - 28APR2014 | 50 | 2.924 | 0.798 | 2.1 | 2.4 | 2.7 | 3.2 | 5.9 | 0 | 0 | 0.0% |
| S331-173 | DIS. MG | mg/L | 31 | 06MAY2013 - 28APR2014 | 50 | 9.126 | 2.156 | 5.6 | 7.8 | 8.7 | 10 | 16.3 | 0 | 0 | 0.0% |
| S331-173 | DIS. NA | mg/L | 28 | 06MAY2013 - 28APR2014 | 50 | 36.732 | 7.235 | 23.9 | 33.2 | 35.65 | 40.1 | 60.8 | 0 | 0 | 0.0% |
| S331-173 | TOT. CL | mg/L | 32 | 06MAY2013 - 28APR2014 | 50 | 55.862 | 11.666 | 35.6 | 48.7 | 54.35 | 60.3 | 92.7 | 0 | 0 | 0.0% |

**Table E-3.** Continued.

| STATION | TEST NAME | UNITS | TEST NUMBER | PERIOD OF RECORD | # OF SAMPLES | MEAN | STD | MIN | Q25 | MEDIAN | Q75 | MAX | # BELOW DETECTION LIMIT | # OF EXCURSIONS | % EXCURSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S331-173 | TOT. SO4 | mg/L | 33 | 08JUL2013 - 14APR2014 | 4 | 3.600 | 3.362 | 0.4 | 0.7 | 3.65 | 6.5 | 6.7 | 0 | 0 | 0.0% |
| S331-173 | DIS. ORGAN. C | mg/L | 89;181 | 08JUL2013 - 14APR2014 | 4 | 14.500 | 0.560 | 13.8 | 14.05 | 14.6 | 14.95 | 15 | 0 | 0 | 0.0% |
| S331-173Auto | TN | mg N/L | 80 | 06MAY2013 - 28APR2014 | 355 | 1.176 | 0.135 | 0.75 | 1.106 | 1.16 | 1.249 | 1.656 | 0 | 0 | 0.0% |
| S331-173Auto | NOX | mg N/L | 18;180 | 06MAY2013 - 28APR2014 | 315 | 0.032 | 0.030 | 0.005 | 0.015 | 0.023 | 0.035 | 0.199 | 0 | 0 | 0.0% |
| S331-173Auto | TKN | mg N/L | 21 | 06MAY2013 - 28APR2014 | 355 | 1.148 | 0.125 | 0.72 | 1.09 | 1.15 | 1.22 | 1.48 | 0 | 0 | 0.0% |
| S331-173Auto | TP | mg P/L | 25 | 06MAY2013 - 28APR2014 | 355 | 0.008 | 0.003 | 0.004 | 0.006 | 0.007 | 0.009 | 0.027 | 0 | 0 | 0.0% |
| BERMB3 | DO | mg/L | 8 | 09JUL2013 - 10DEC2013 | 10 | 3.554 | 2.295 | 1.2 | 1.82 | 2.47 | 5.86 | 6.84 | 0 | 6 | 60.0% |
| BERMB3 | FLDCOND. | UMHOS/CM | 9 | 09JUL2013 - 10DEC2013 | 10 | 378.000 | 37.962 | 304 | 356 | 387.5 | 410 | 416 | 0 | 0 | 0.0% |
| BERMB3 | PH | UNITS | 10 | 09JUL2013 - 10DEC2013 | 10 | 7.350 | 0.190 | 7.1 | 7.2 | 7.35 | 7.4 | 7.7 | 0 | 0 | 0.0% |
| BERMB3 | TURBIDITY | NTU | 12 | 09JUL2013 - 15OCT2013 | 2 | 0.950 | 0.495 | 0.6 | 0.6 | 0.95 | 1.3 | 1.3 | 0 | 0 | 0.0% |
| BERMB3 | TSS | mg/L | 16 | 09JUL2013 - 15OCT2013 | 8 | 3.000 | 0.000 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0.0% |
| BERMB3 | HARDNESS | mg/L CACO3 | 35 | 09JUL2013 - 15OCT2013 | 8 | 154.963 | 18.269 | 129.6 | 139.65 | 156.65 | 168.2 | 181.1 | 0 | 0 | 0.0% |
| BERMB3 | TEMP | CENT | 7 | 09JUL2013 - 10DEC2013 | 10 | 27.080 | 2.801 | 23.2 | 24.6 | 27.4 | 28.7 | 32.1 | 0 | 0 | 0.0% |
| BERMB3 | TOTAL DEPTH | METERS | 99 | 11JUN2013 - 07JAN2014 | 13 | 0.213 | 0.103 | 0.06 | 0.11 | 0.25 | 0.28 | 0.33 | 0 | 0 | 0.0% |
| BERMB3 | TN | mg N/L | 80 | 09JUL2013 - 15OCT2013 | 8 | 0.792 | 0.127 | 0.59 | 0.7235 | 0.77 | 0.875 | 1.01 | 0 | 0 | 0.0% |
| BERMB3 | NOX | mg N/L | 18;180 | 09JUL2013 - 15OCT2013 | 8 | 0.005 | 0.001 | 0.005 | 0.005 | 0.005 | 0.005 | 0.007 | 0 | 0 | 0.0% |
| BERMB3 | TKN | mg N/L | 21 | 09JUL2013 - 15OCT2013 | 8 | 0.791 | 0.128 | 0.59 | 0.72 | 0.77 | 0.875 | 1.01 | 0 | 0 | 0.0% |
| BERMB3 | TP | mg P/L | 25 | 09JUL2013 - 10DEC2013 | 10 | 0.025 | 0.025 | 0.012 | 0.013 | 0.015 | 0.023 | 0.093 | 0 | 0 | 0.0% |
| BERMB3 | DIS. CA | mg/L | 30 | 09JUL2013 - 15OCT2013 | 8 | 55.963 | 6.440 | 47.3 | 50.4 | 56.45 | 60.55 | 65.6 | 0 | 0 | 0.0% |
| BERMB3 | DIS. K | mg/L | 29 | 09JUL2013 - 15OCT2013 | 8 | 1.875 | 0.403 | 1.3 | 1.6 | 1.8 | 2.25 | 2.4 | 0 | 0 | 0.0% |
| BERMB3 | DIS. MG | mg/L | 31 | 09JUL2013 - 15OCT2013 | 8 | 3.700 | 0.650 | 2.8 | 3.15 | 3.75 | 4.25 | 4.5 | 0 | 0 | 0.0% |
| BERMB3 | DIS. NA | mg/L | 28 | 09JUL2013 - 15OCT2013 | 8 | 13.425 | 3.781 | 7.5 | 10.5 | 14.15 | 16.15 | 18.3 | 0 | 0 | 0.0% |
| BERMB3 | TOT. CL | mg/L | 32 | 09JUL2013 - 15OCT2013 | 8 | 22.325 | 6.603 | 12.2 | 17.45 | 23.2 | 26.4 | 32.3 | 0 | 0 | 0.0% |
| BERMB3 | TOT. SO4 | mg/L | 33 | 09JUL2013 - 15OCT2013 | 2 | 0.100 | 0.000 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0 | 0 | 0.0% |

**Table E-4.** Dissolved oxygen compliance summary for the Non-ECP for WY2014. (Note: Min, median, max, mean, and standard deviation are in mg/L).

| Station | Samples | Min | Median | Max | Mean | Standard Deviation | Excursions | Excursion Rate | Compliance Status* |
|---|---|---|---|---|---|---|---|---|---|
| BERMB3 | 10 | 1.2 | 2.5 | 6.8 | 3.6 | 2.3 | 6 | 60% | Exceeds Criterion |
| C123SR84 | 16 | 1.0 | 2.4 | 7.4 | 3.0 | 1.9 | 10 | 63% | Exceeds Criterion |
| G123 | 12 | 2.1 | 3.8 | 4.9 | 3.7 | 0.9 | 2 | 17% | Exceeds Criterion |
| G94B | 14 | 1.1 | 4.1 | 6.2 | 3.9 | 1.7 | 5 | 36% | Exceeds Criterion |
| S11A | 21 | 3.0 | 5.1 | 8.3 | 5.3 | 1.5 | 0 | 0% | Complies |
| S12D | 40 | 1.7 | 3.1 | 4.4 | 3.0 | 0.7 | 22 | 55% | Exceeds Criterion |
| S140 | 50 | 0.1 | 4.3 | 8.9 | 4.1 | 1.9 | 17 | 34% | Exceeds Criterion |
| S142 | 12 | 2.9 | 4.2 | 5.5 | 4.2 | 0.8 | 0 | 0% | Complies |
| S145 | 22 | 2.1 | 4.8 | 6.4 | 4.6 | 1.2 | 2 | 9% | Complies |
| S151 | 32 | 1.8 | 3.2 | 5.4 | 3.4 | 1.1 | 16 | 50% | Exceeds Criterion |
| S175 | 1 | 3.4 | 3.4 | 3.4 | 3.4 | N/A | 1 | 100% | Exceeds Criterion |
| S177 | 42 | 0.7 | 3.3 | 8.2 | 3.5 | 1.8 | 21 | 50% | Exceeds Criterion |
| S178 | 35 | 1.2 | 4.0 | 8.7 | 4.3 | 1.9 | 14 | 40% | Exceeds Criterion |
| S18C | 52 | 1.2 | 5.1 | 8.6 | 5.2 | 2.0 | 11 | 21% | Exceeds Criterion |
| S190 | 51 | 1.5 | 6.0 | 9.5 | 5.6 | 2.2 | 7 | 14% | Exceeds Criterion |
| S197 | 6 | 4.1 | 7.7 | 8.9 | 7.4 | 1.7 | 0 | 0% | Complies |
| S31 | 18 | 1.3 | 2.9 | 4.2 | 2.7 | 0.9 | 14 | 78% | Exceeds Criterion |
| S331-173 | 52 | 0.3 | 1.8 | 7.1 | 2.0 | 1.2 | 45 | 87% | Exceeds Criterion |
| S332DX | 52 | 0.3 | 2.3 | 6.7 | 2.7 | 1.7 | 35 | 67% | Exceeds Criterion |
| S333 | 50 | 1.8 | 3.2 | 7.7 | 3.2 | 1.1 | 27 | 54% | Exceeds Criterion |
| S34 | 20 | 2.5 | 5.0 | 7.0 | 4.8 | 1.2 | 1 | 5% | Complies |
| S344 | 4 | 1.2 | 2.7 | 3.5 | 2.5 | 1.0 | 4 | 100% | Exceeds Criterion |
| S356-334 | 50 | 0.3 | 2.1 | 5.1 | 2.2 | 1.1 | 41 | 82% | Exceeds Criterion |
| S38 | 26 | 1.0 | 2.5 | 5.4 | 2.8 | 1.2 | 19 | 73% | Exceeds Criterion |
| S39 | 24 | 1.6 | 5.2 | 7.9 | 5.2 | 1.9 | 4 | 17% | Exceeds Criterion |
| S9 | 51 | 0.4 | 2.7 | 5.0 | 2.8 | 1.3 | 29 | 57% | Exceeds Criterion |
| S9A | 51 | 0.4 | 2.5 | 8.3 | 2.7 | 1.6 | 32 | 63% | Exceeds Criterion |
| US41-25 | 18 | 1.6 | 2.6 | 4.2 | 2.7 | 0.7 | 11 | 61% | Exceeds Criterion |

* To be in compliance, a site's DO excursion rate must be less than or equal to 10%.

# Attachment F: Time-Series and Trend Plots of Total Phosphorus at Non-Everglades Construction Project Monitoring Sites for Water Year 2014 and Earlier Periods

Shi Kui Xue

Graphs in this attachment depict annual FWM TP concentration data collected from May 1, 1997 through April 30, 2014, for the Non-ECP water quality monitoring sites. The graph sequencing follows the station order shown in Attachment D, **Tables D-1 and D-2**. Non-ECP structure locations are depicted in **Figure 1** of the report.

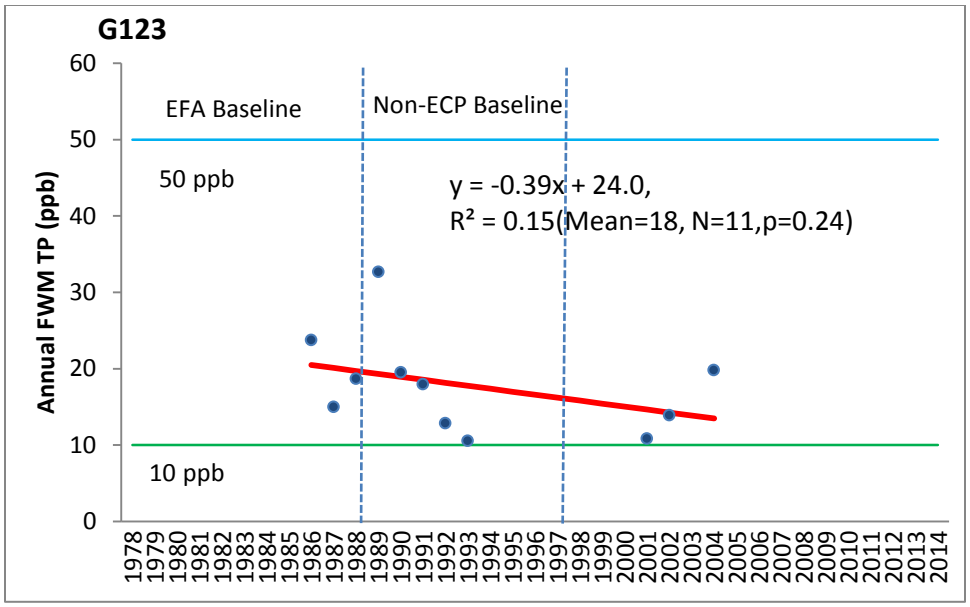



**Figure F-1.** Annual FWM TP concentration trend at the G-123 structure.

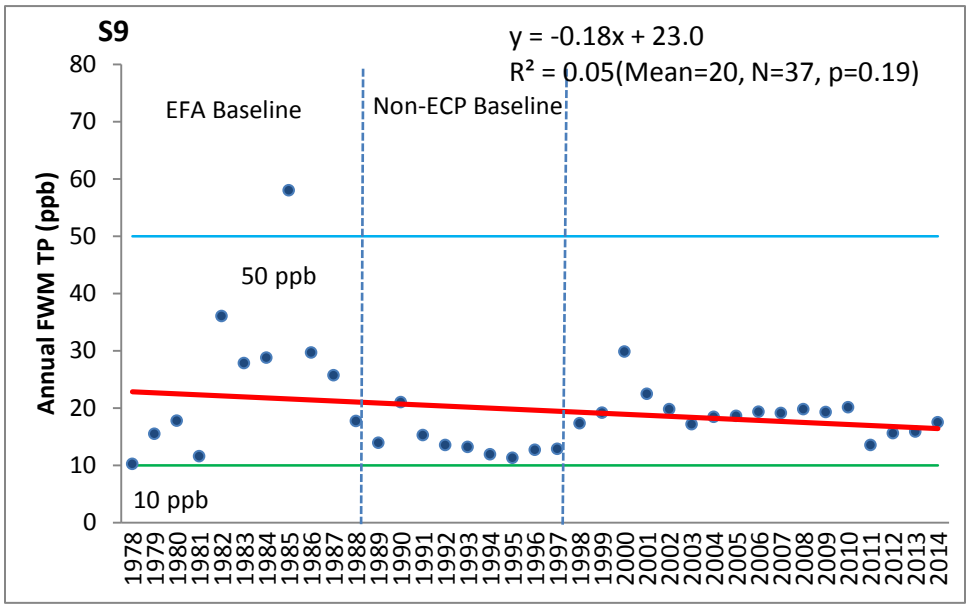



**Figure F-2.** Annual FWM TP concentration trend at the S-9 structure.

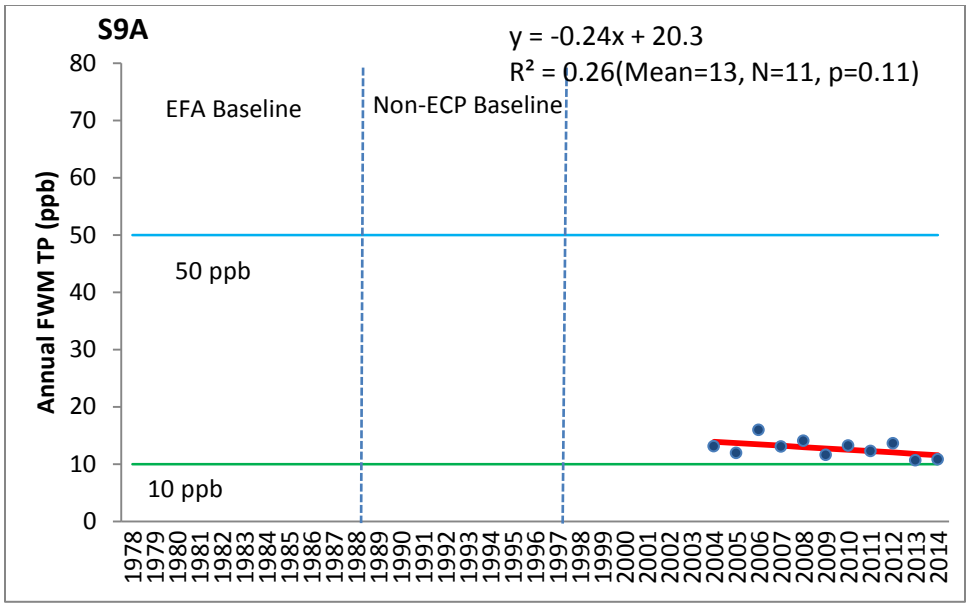



**Figure F-3.** Annual FWM TP concentration trend at the S-9A structure.

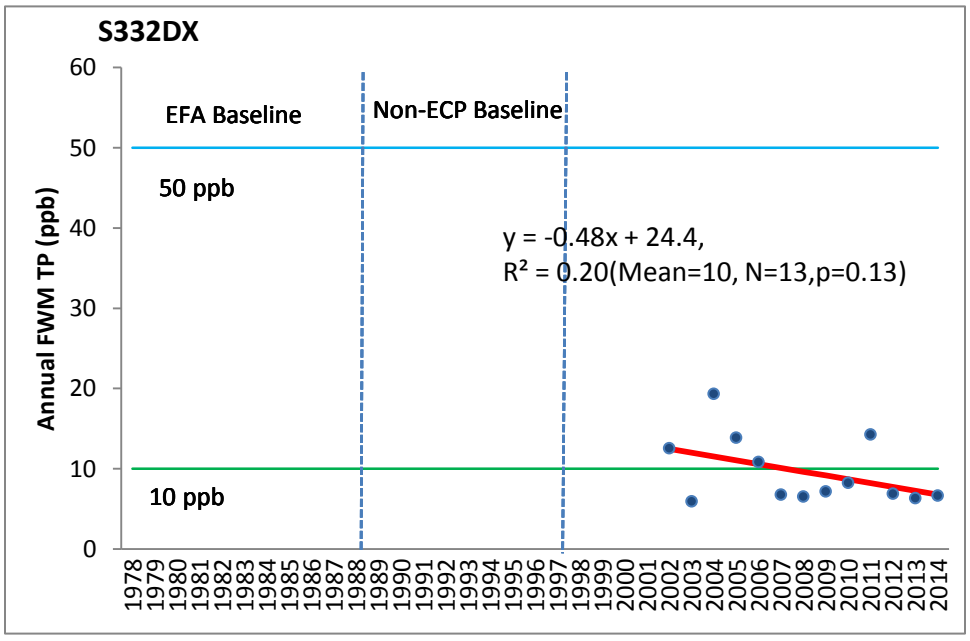



**Figure F-4.** Annual FWM TP concentration trend at the S-332DX structure.

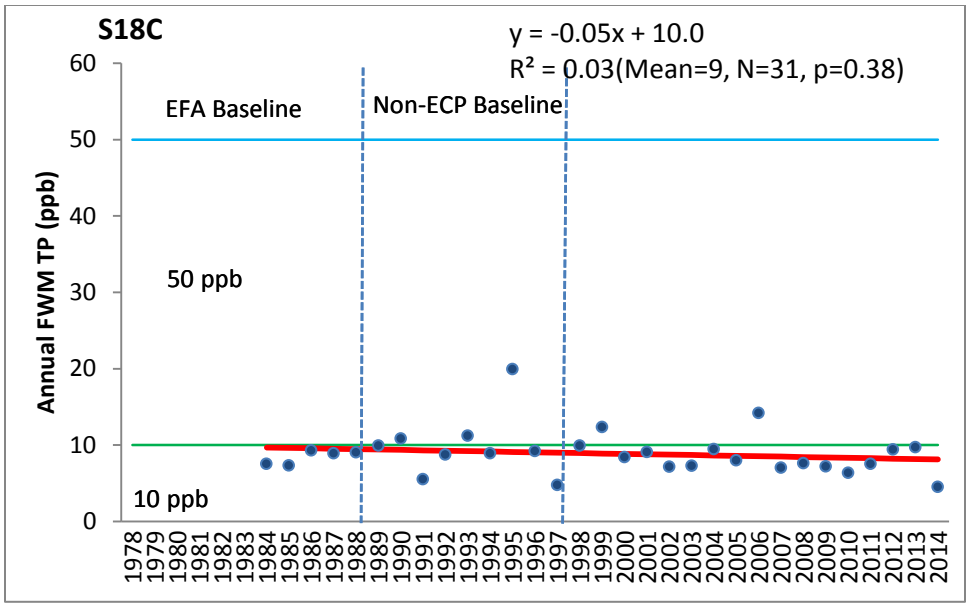



**Figure F-5.** Annual FWM TP concentration trend at the S-18C structure.

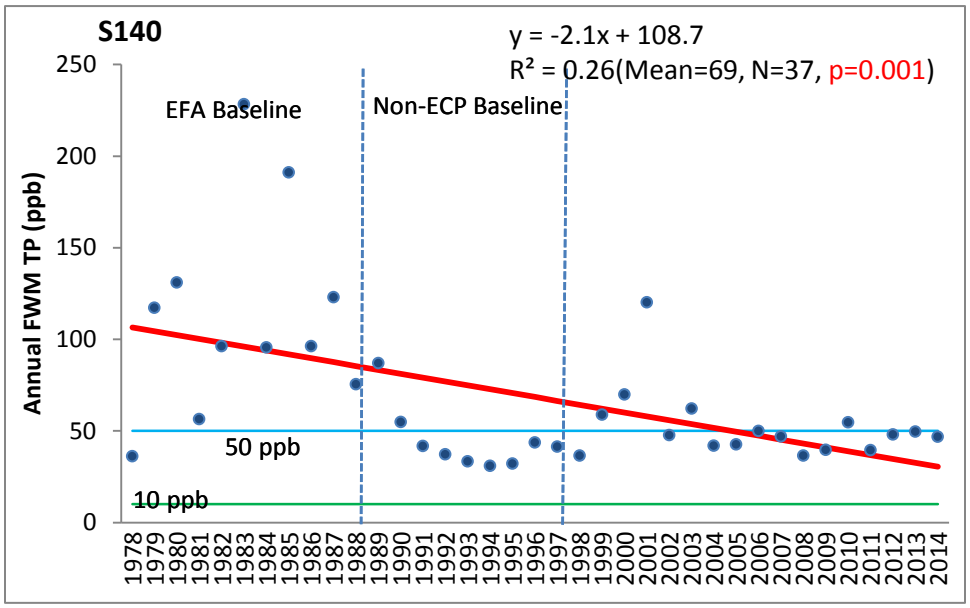



**Figure F-6.** Annual FWM TP concentration trend at the S-140 structure.

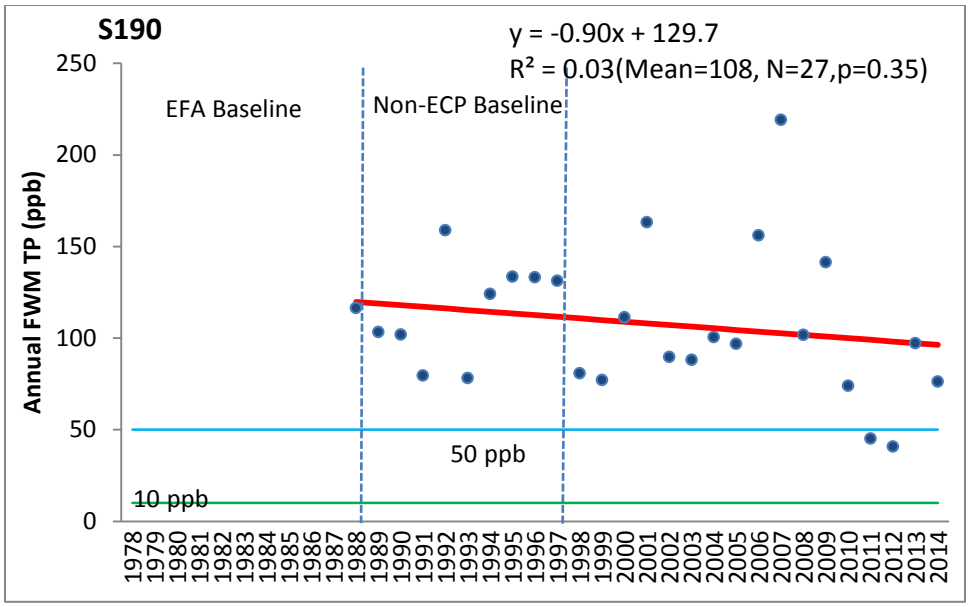



**Figure F-7.** Annual FWM TP concentration trend at the S-190 structure.

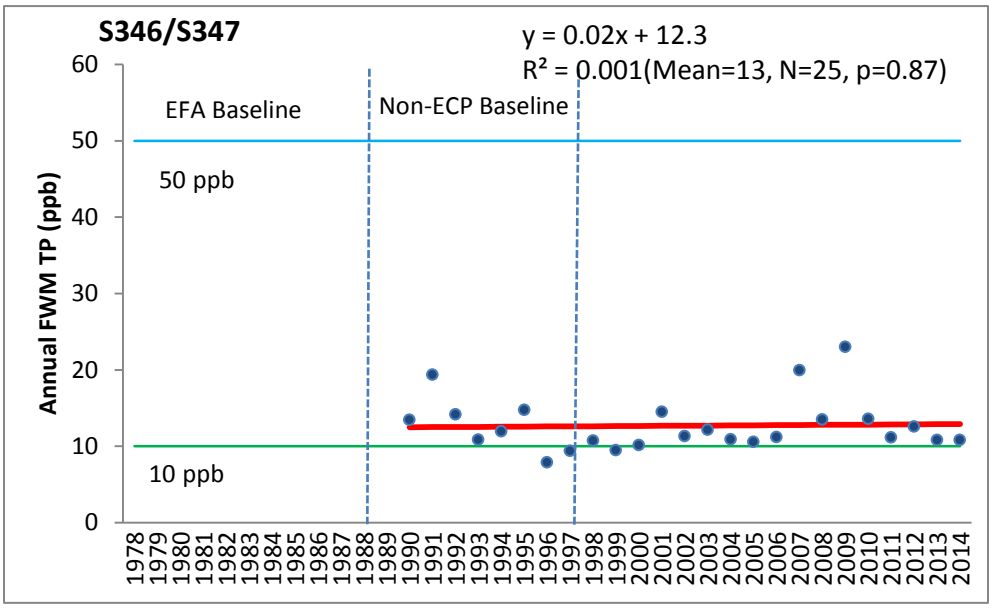



**Figure F-8.** Annual FWM TP concentration trend at the S-346/S-347 structures.

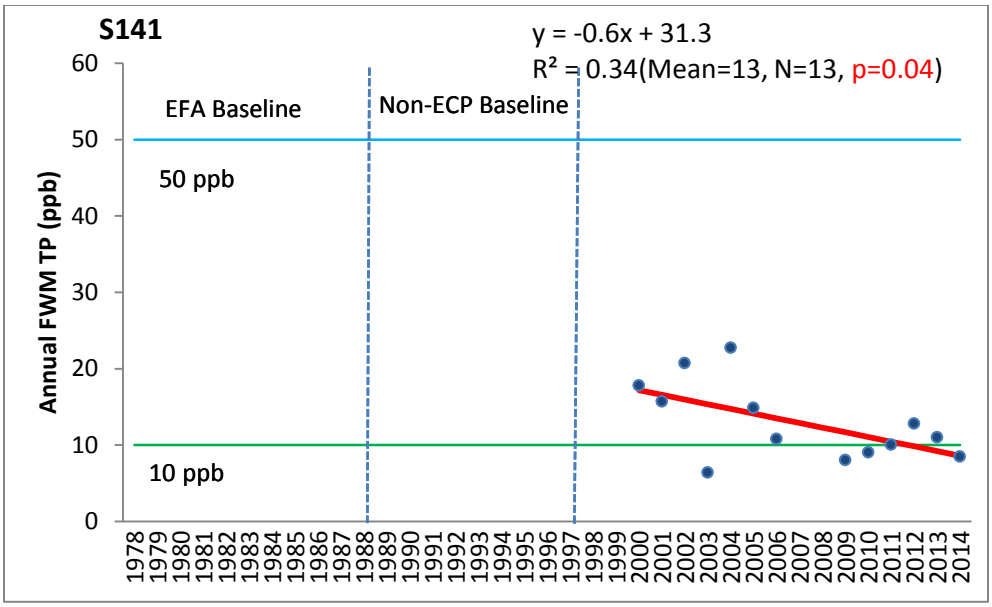



**Figure F-9.** Annual FWM TP concentration trend at the S-141 structure.

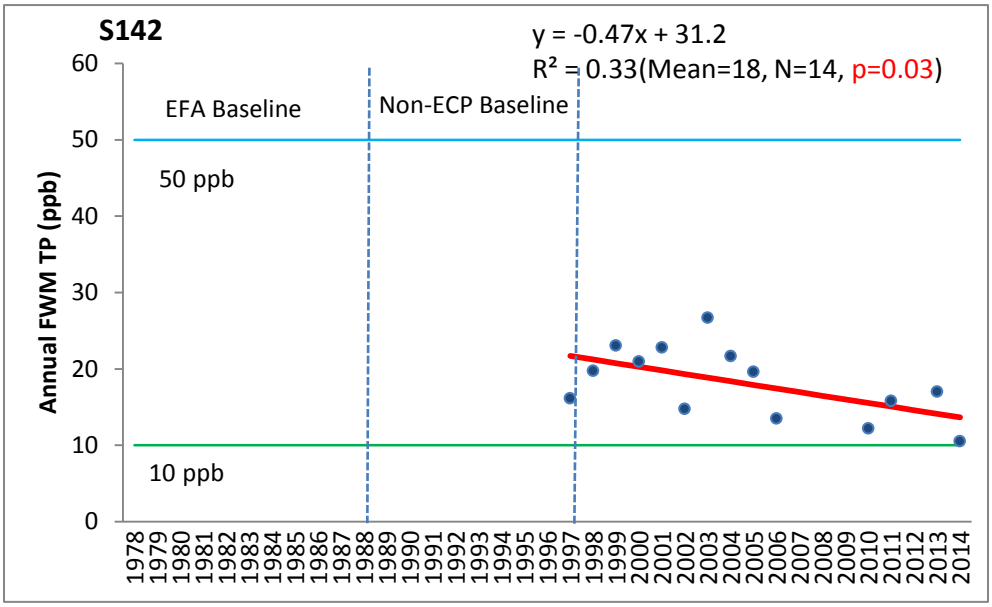



**Figure F-10.** Annual FWM TP concentration trend at the S-142 structure.

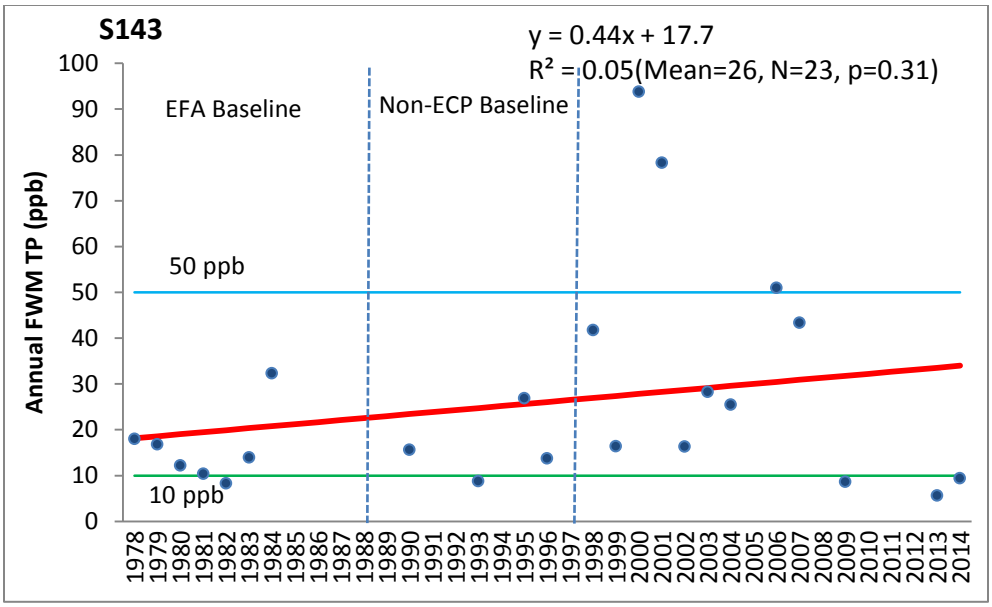



**Figure F-11.** Annual FWM TP concentration trend at the S-143 structure.

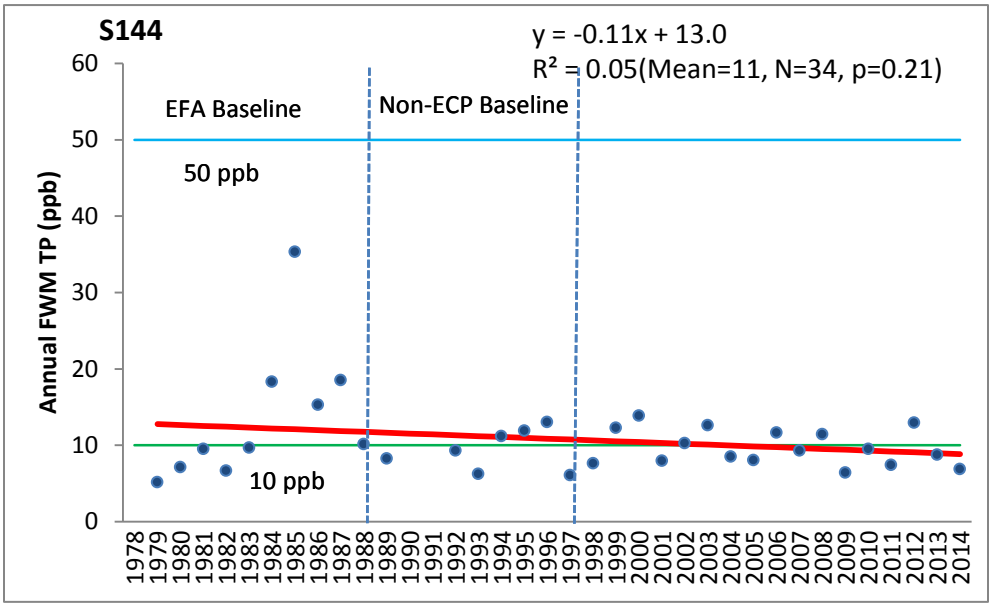



**Figure F-12.** Annual FWM TP concentration trend at the S-144 structure

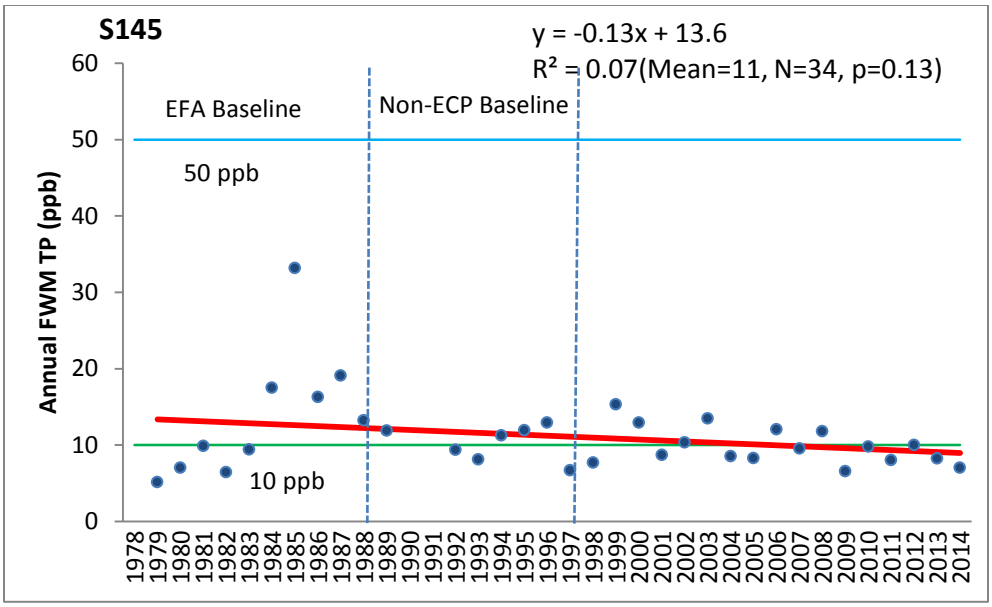



**Figure F-13.** Annual FWM TP concentration trend at S145 structure.

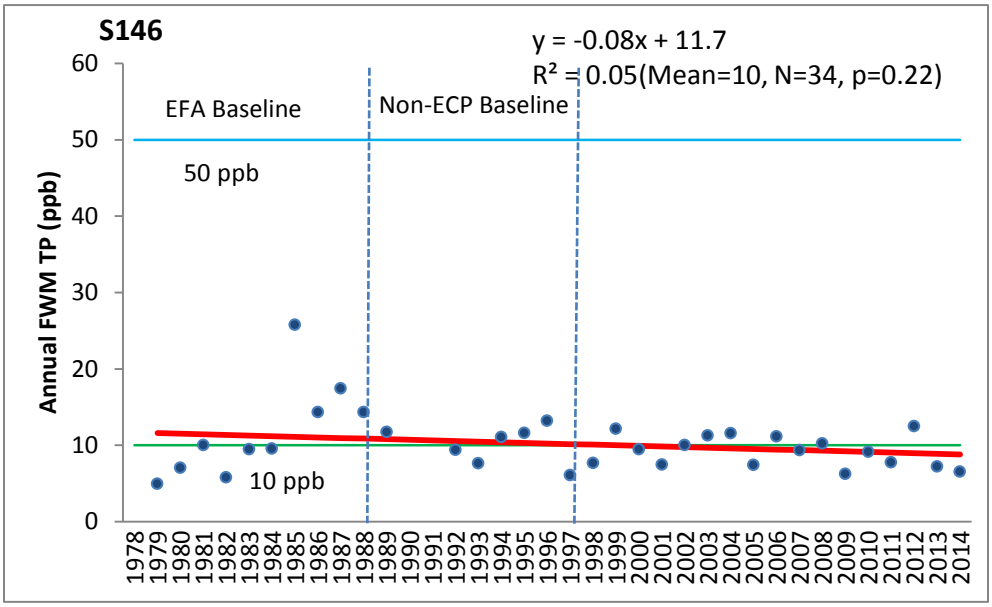



**Figure F-14.** Annual FWM TP concentration trend at the S-146 structure.

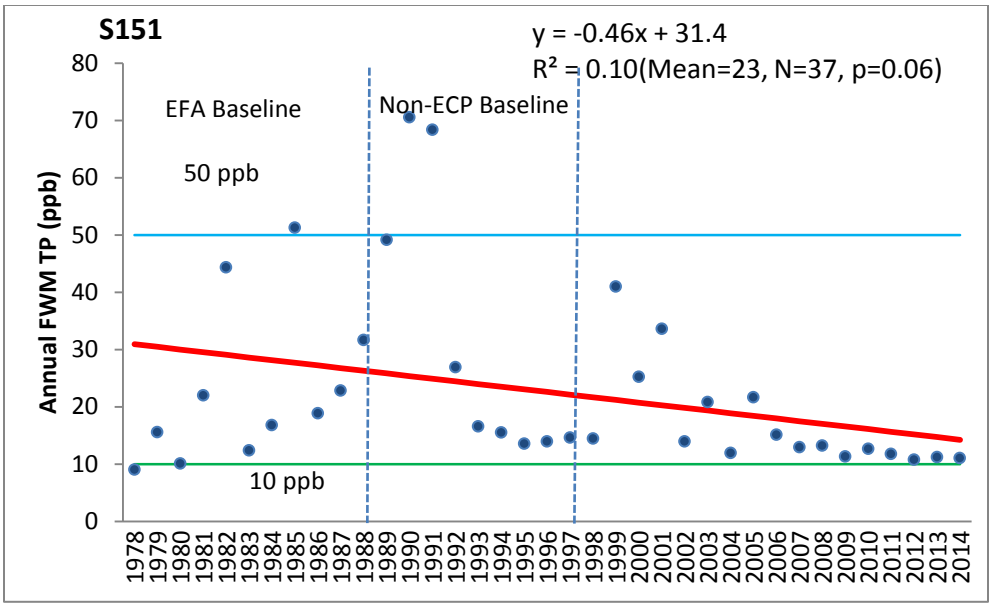



**Figure F-15.** Annual FWM TP concentration trend at the S-151 structure.

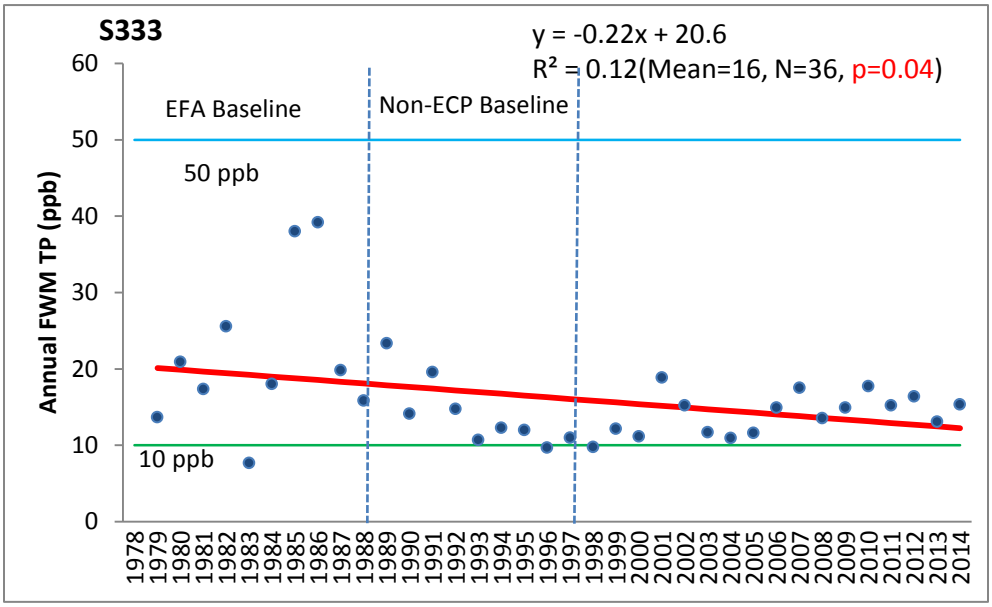



**Figure F-16.** Annual FWM TP concentration trend at the S-333 structure.

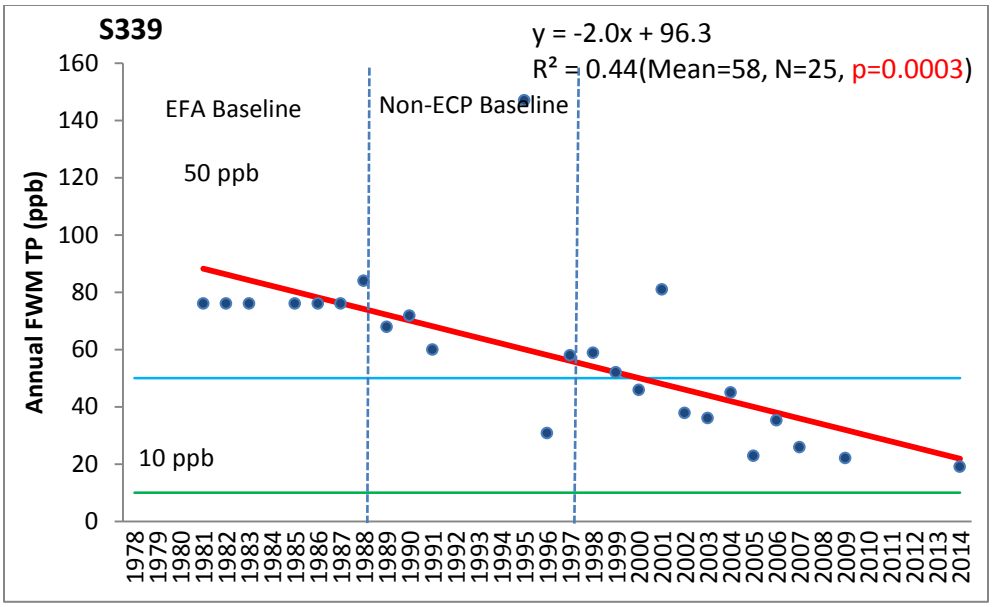



**Figure F-17.** Annual FWM TP concentration trend at the S-339 structure.

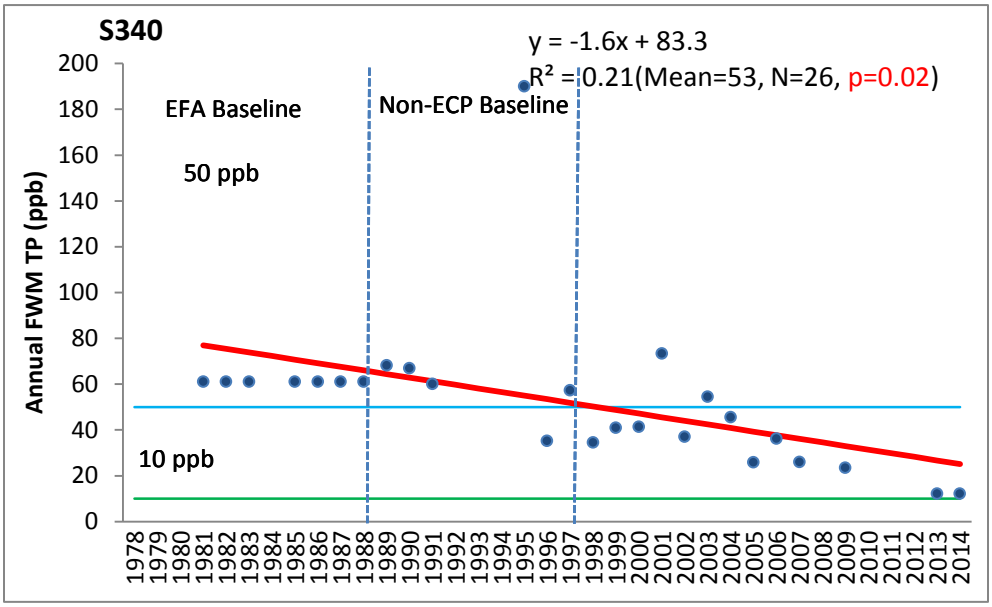



**Figure F-18.** Annual FWM TP concentration trend at the S-340 structure.

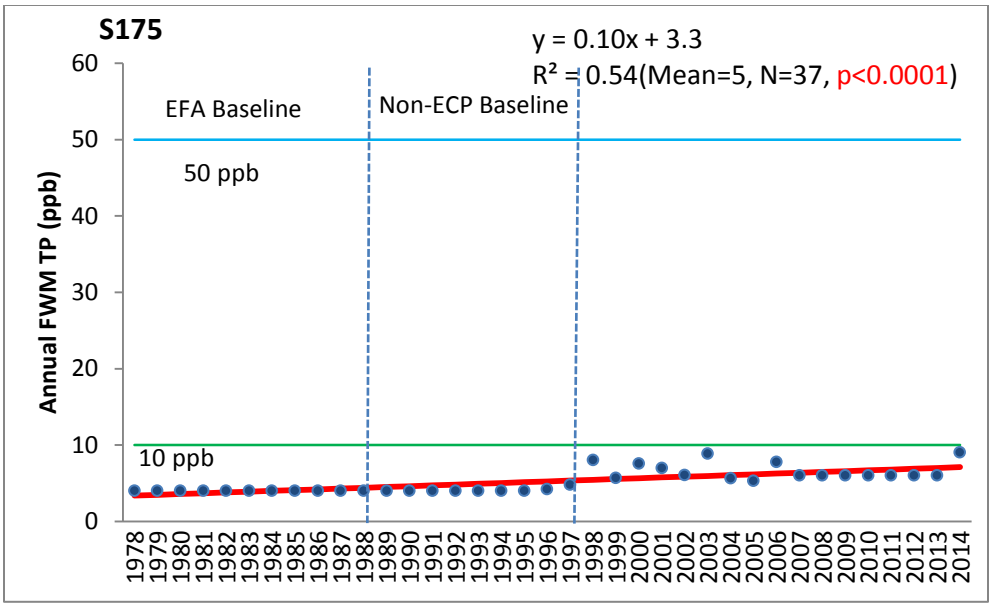



**Figure F-19.** Annual FWM TP concentration trend at the S-175 structure.

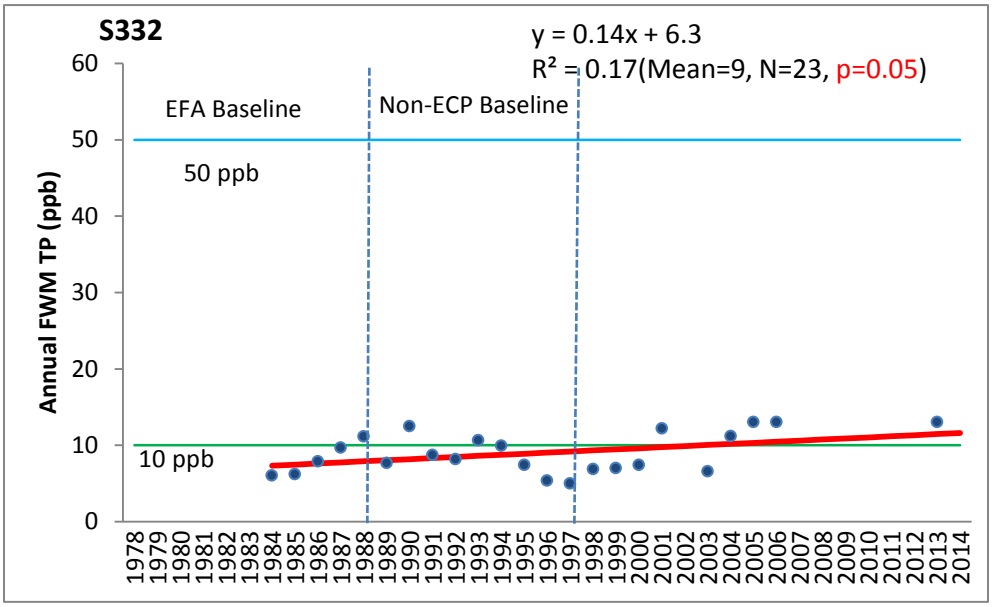



**Figure F-20.** Annual FWM TP concentration trend at the S-332 structure.

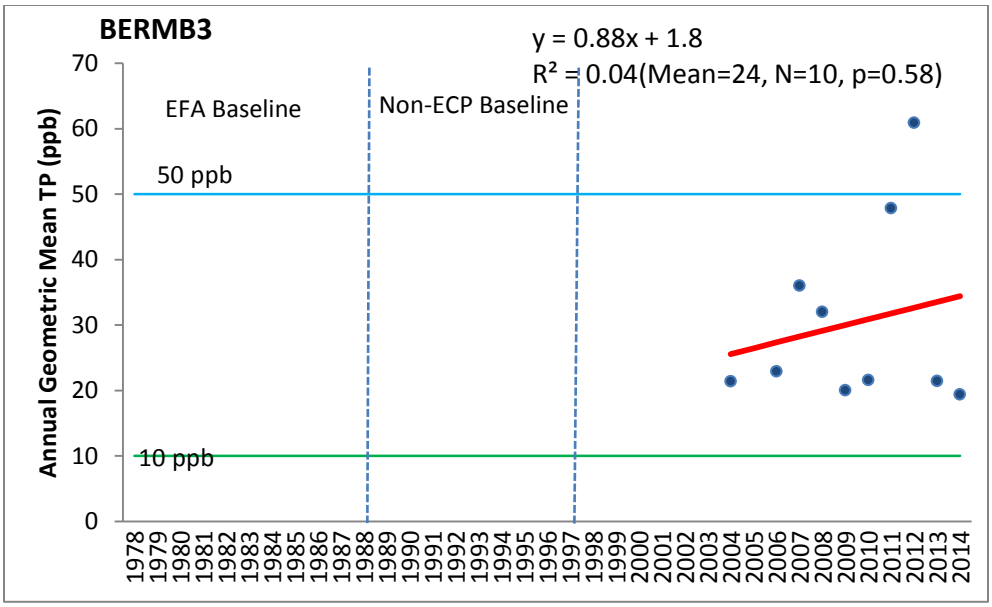



**Figure F-21.** Annual Geometric Mean TP concentration trend at the BERMB3 structure (no flow was measured).

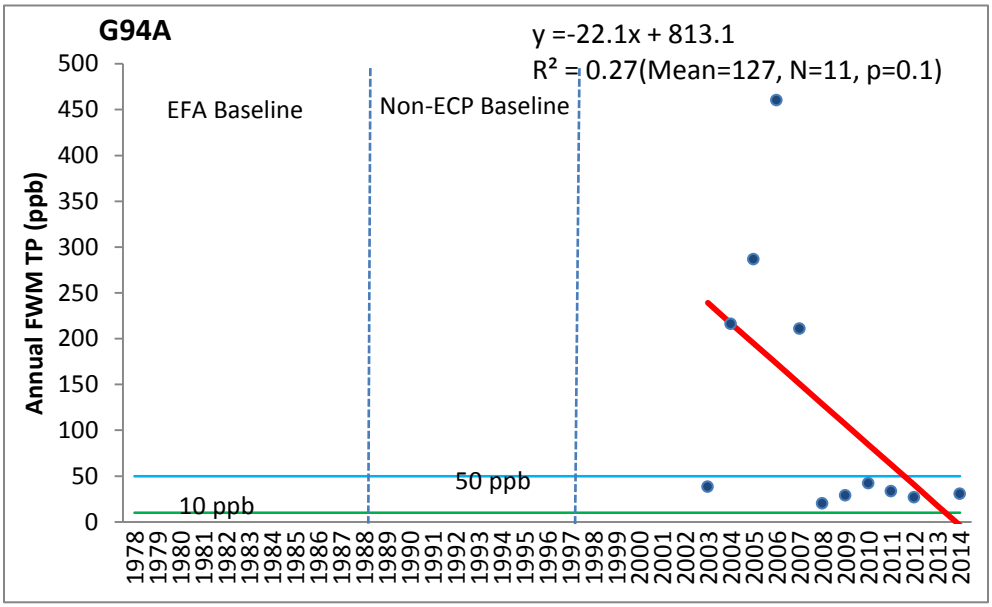



**Figure F-22.** Annual FWM TP concentration trend at the G-94A structure.

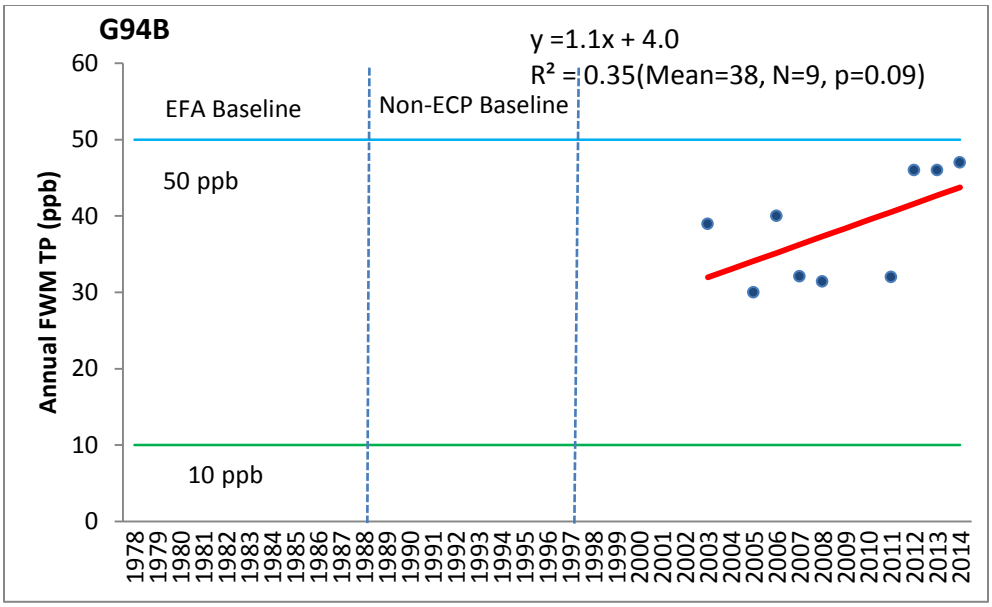



**Figure F-23.** Annual FWM TP concentration trend at the G-94B structure.

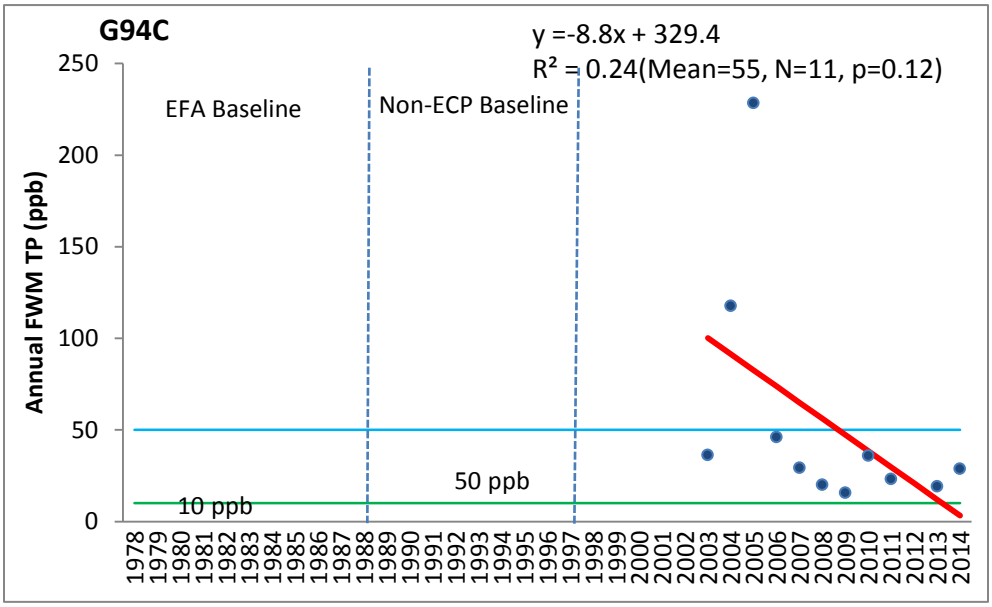



**Figure F-24.** Annual FWM TP concentration trend at the G-94C structure.

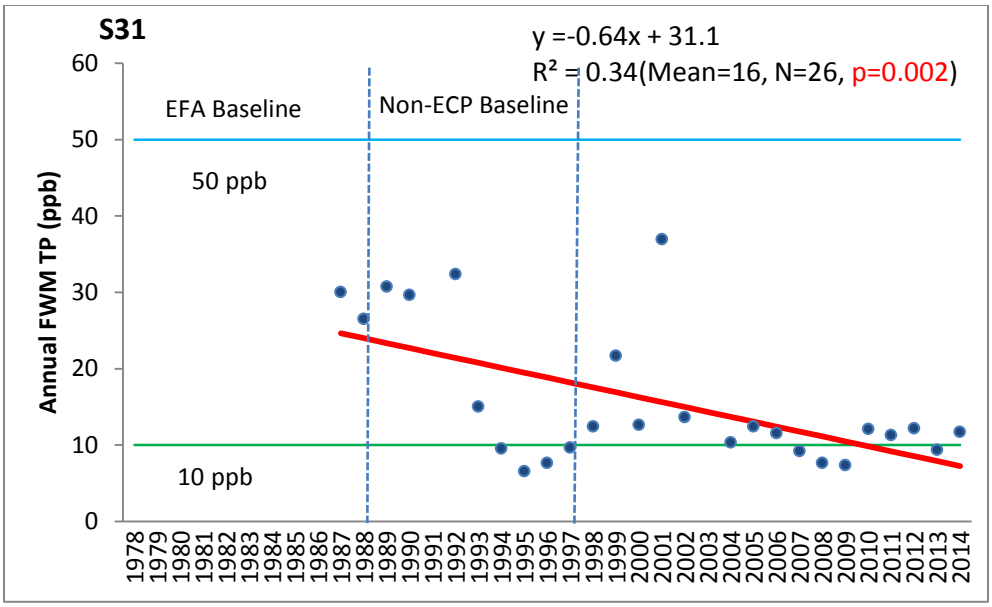



**Figure F-25.** Annual FWM TP concentration trend at the S-31 structure.

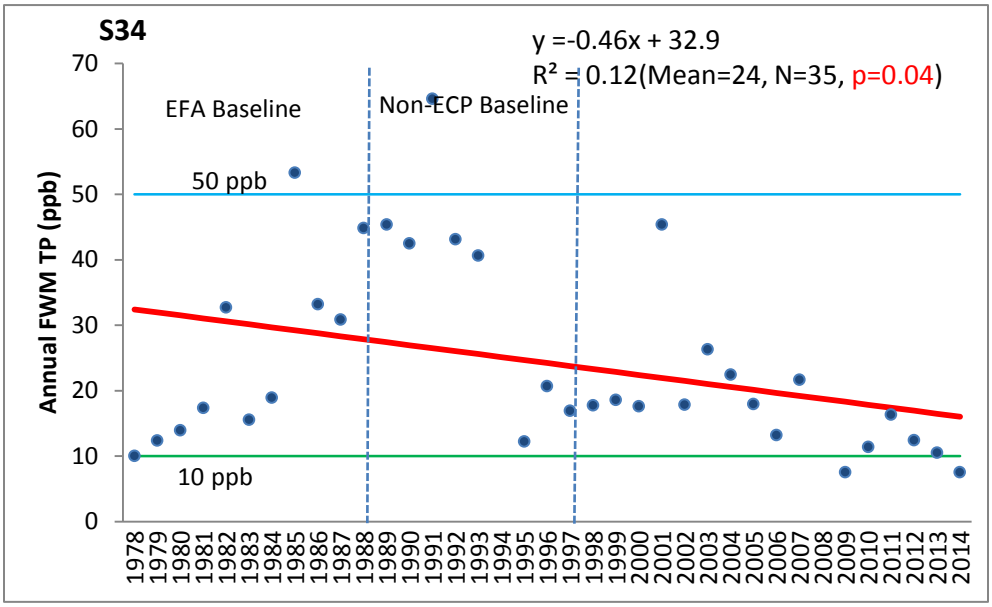



**Figure F-26.** Annual FWM TP concentration trend at the S-34 structure.

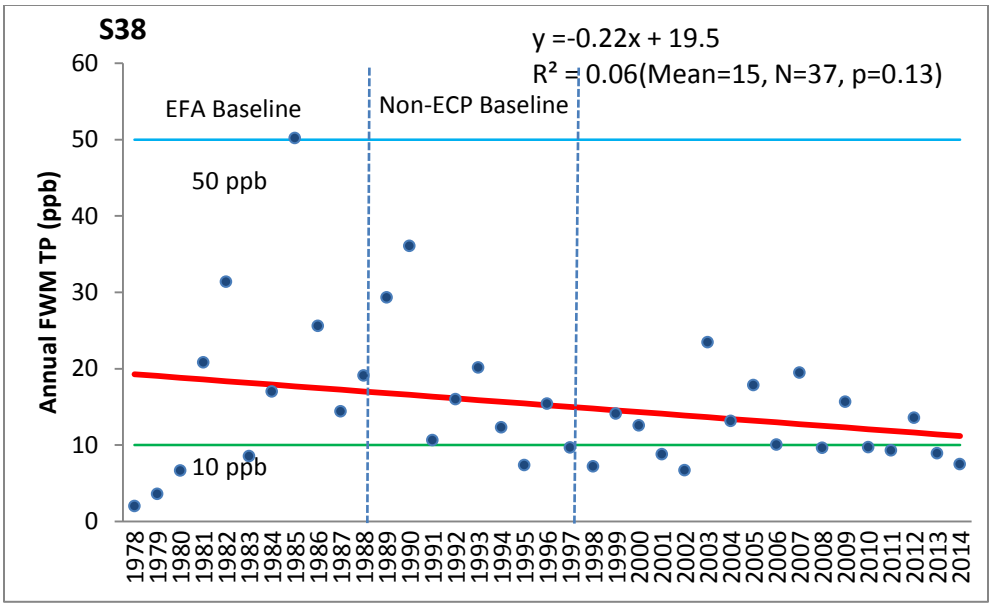



**Figure F-27.** Annual FWM TP concentration trend at the S-38 structure.

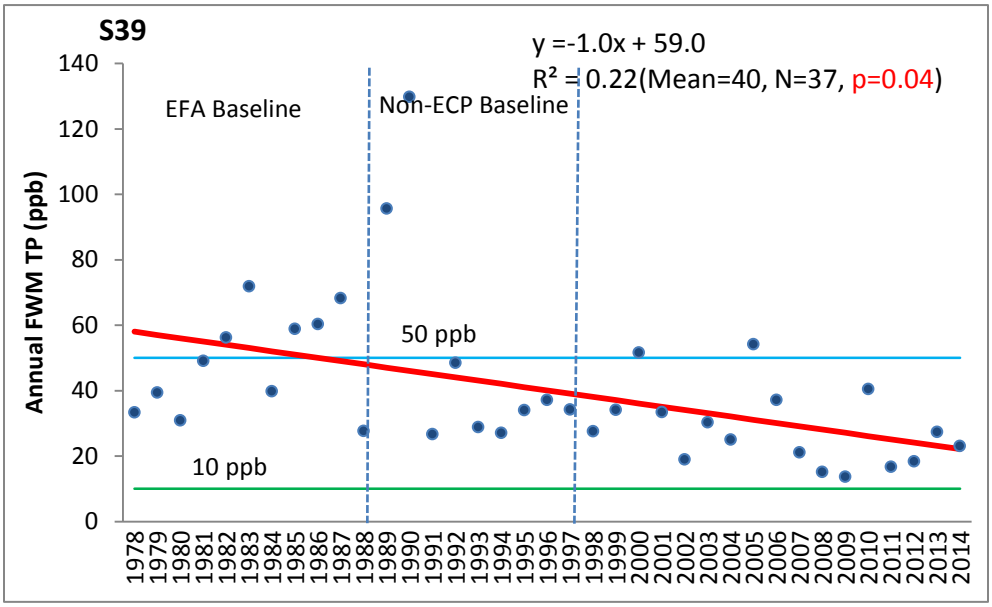



**Figure F-28.** Annual FWM TP concentration trend at the S-39 structure.

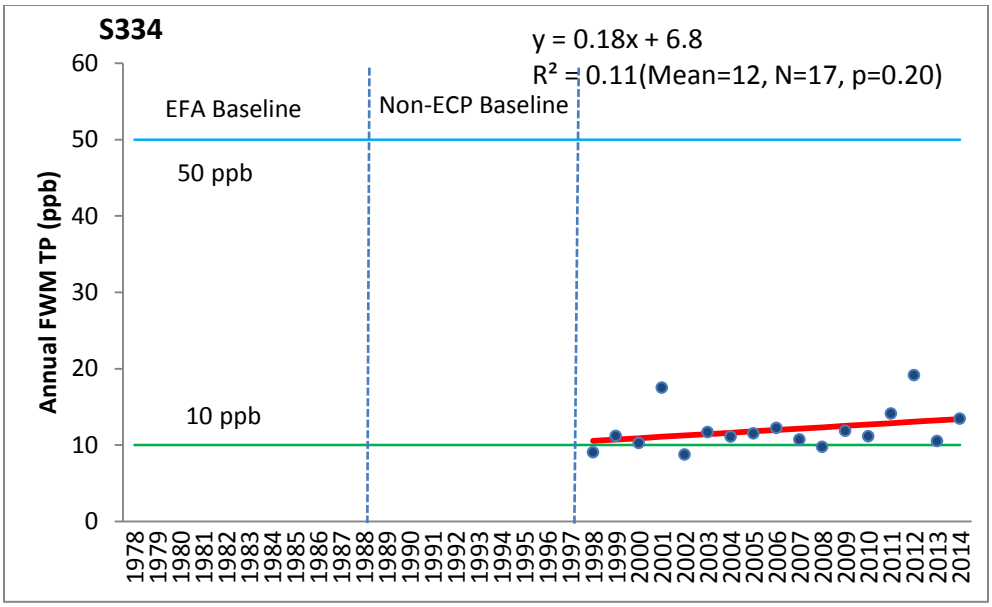



**Figure F-29.** Annual FWM TP concentration trend at the S-334 structure.

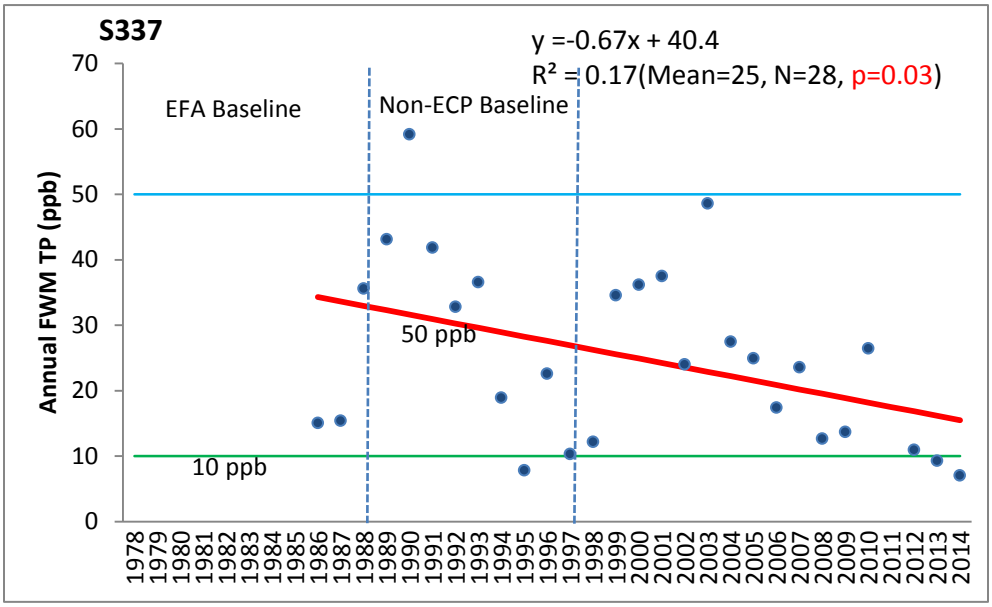



**Figure F-30.** Annual FWM TP concentration trend at the S-337 structure.

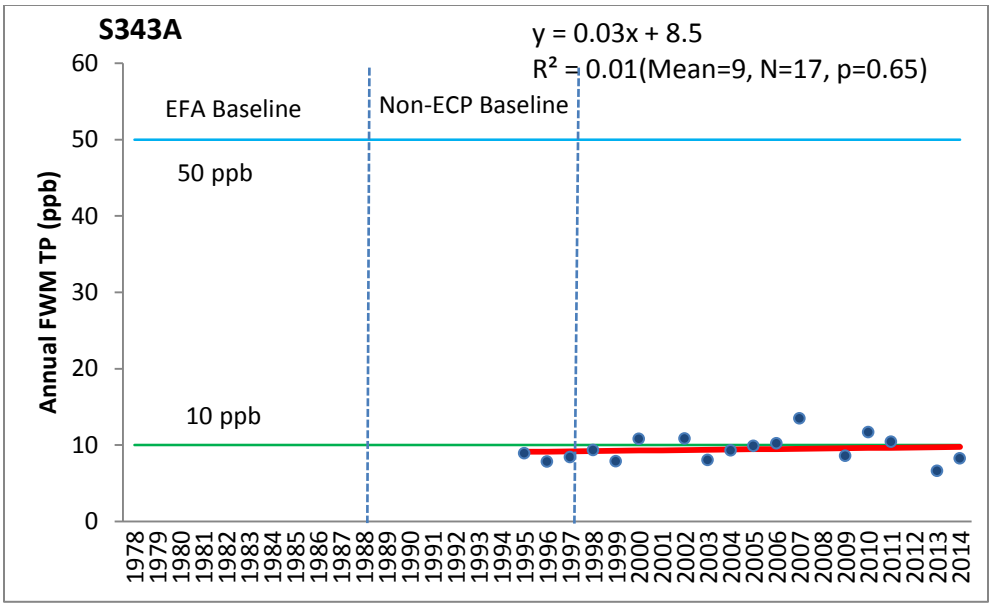



**Figure E-31.** Annual FWM TP concentration trend at the S-343A structure.

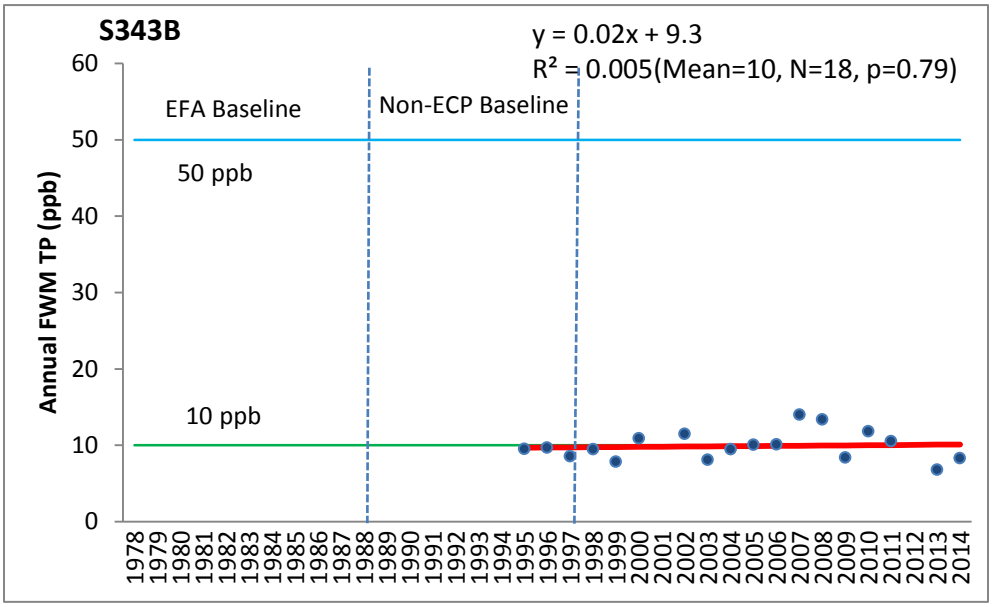



**Figure F-32.** Annual FWM TP concentration trend at the S-343B structure.

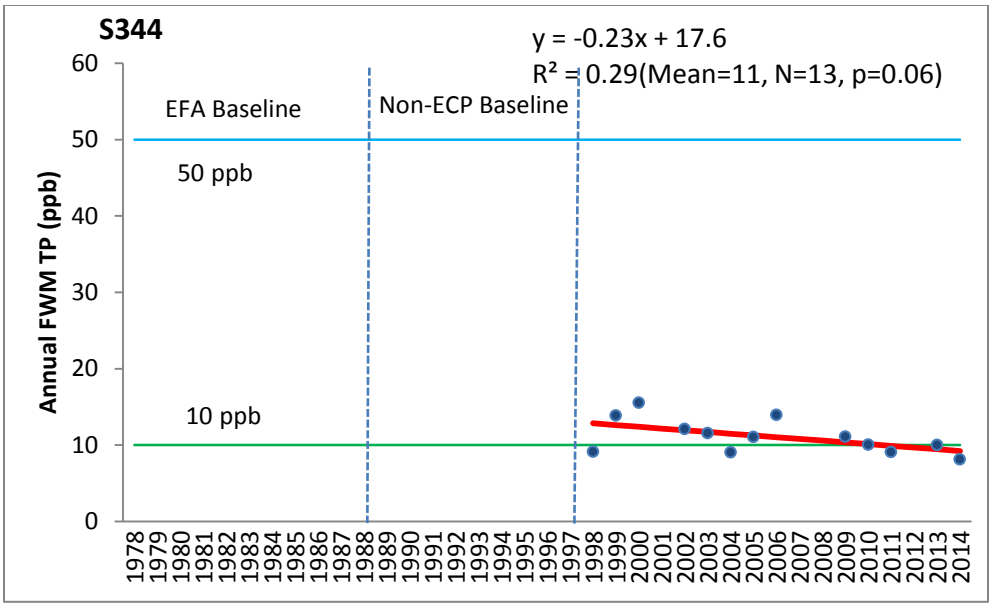



**Figure F-33.** Annual FWM TP concentration trend at the S-344 structure.

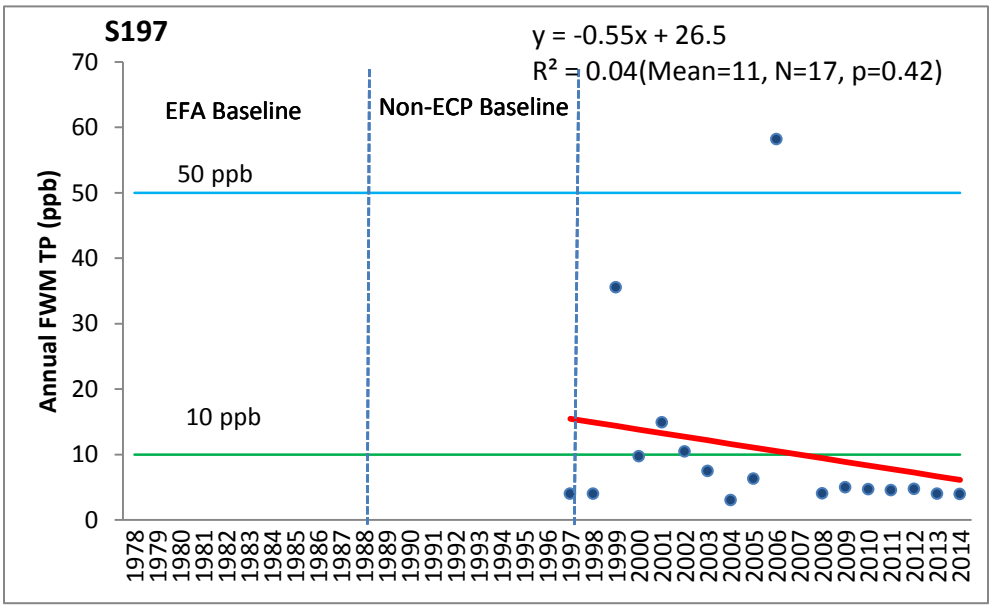



**Figure F-34.** Annual FWM TP concentration trend at the S-197 structure.

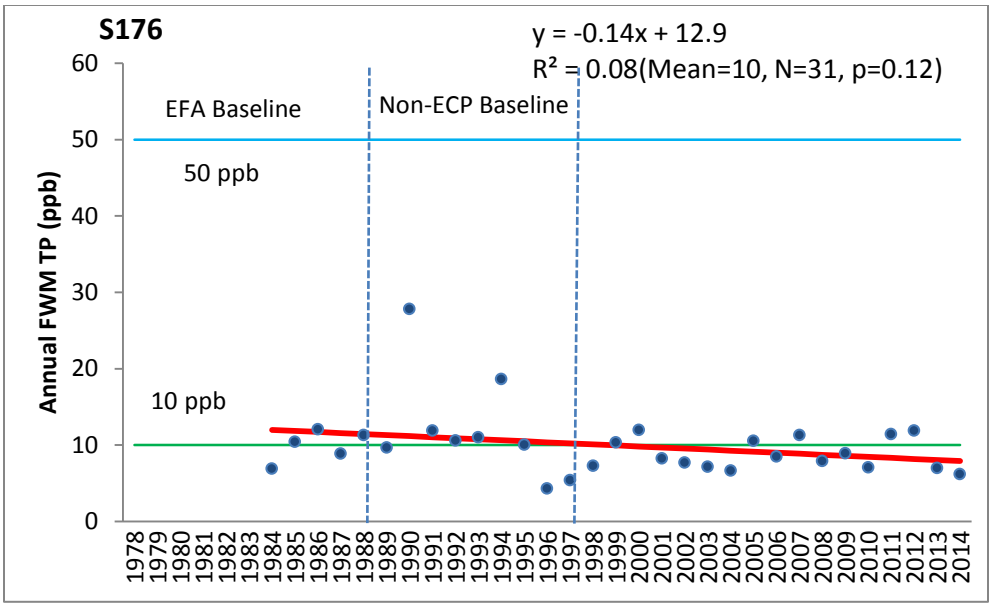



**Figure F-35.** Annual FWM TP concentration trend at the S-176 structure.

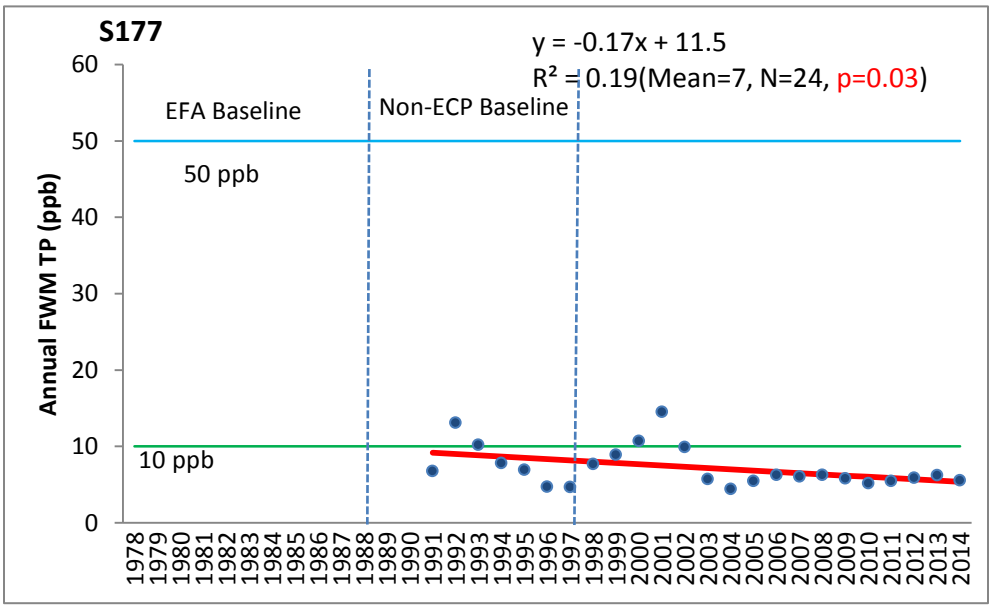



**Figure F-36.** Annual FWM TP concentration trend at the S-177 structure.

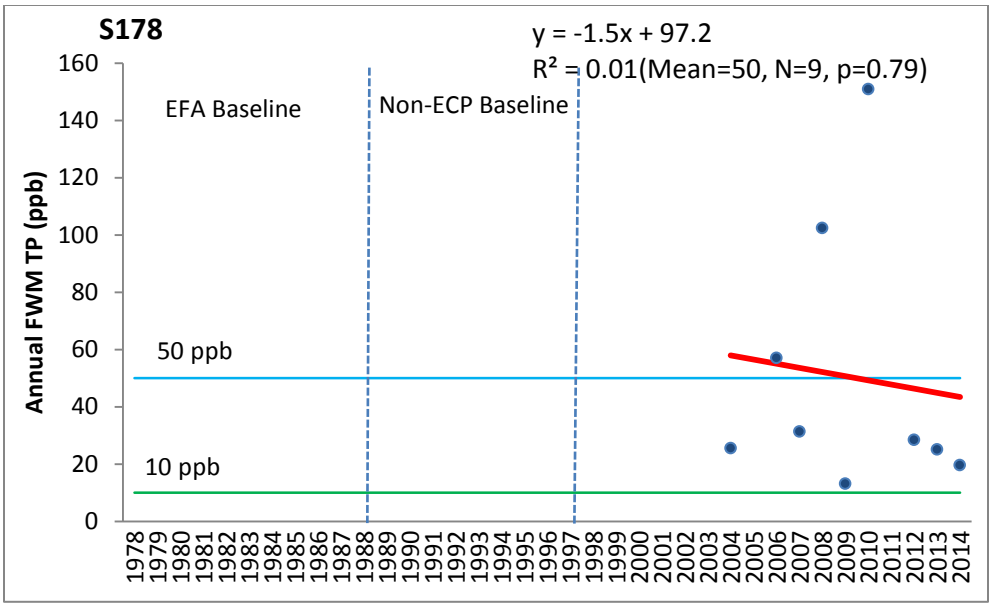



**Figure F-37.** Annual FWM TP concentration trend at the S-178 structure.

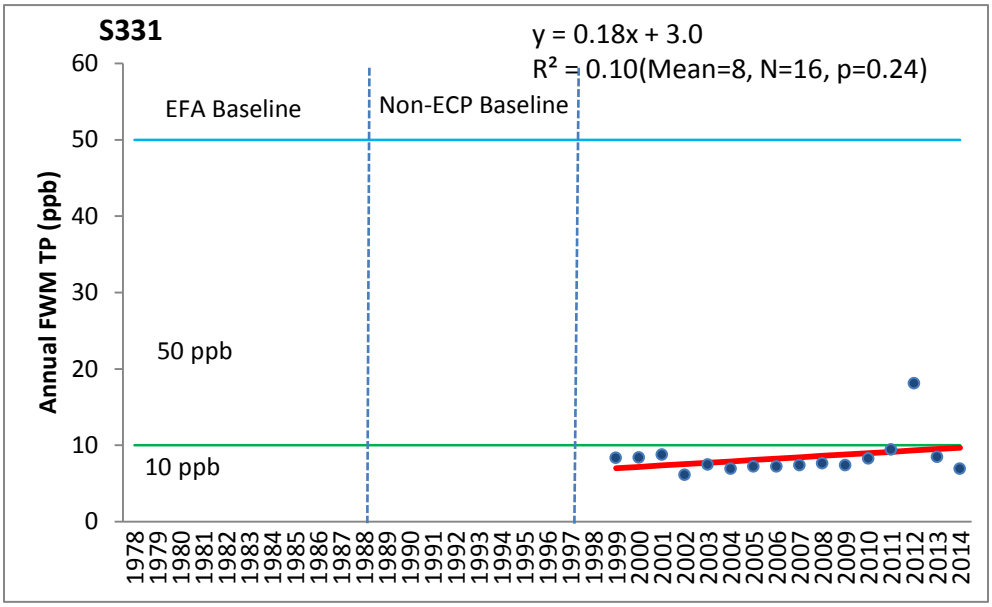



**Figure F-38.** Annual FWM TP concentration trend at the S-331 structure.

# Attachment G: Non-ECP Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area

Ben Gu and Nicole Howard

Contributors: Joseph Claude, Deena Ruiz,
Richard Walker, Michael Wright
and Yvette Rauscher

## SUMMARY

This attachment summarizes data from compliance monitoring of mercury (Hg) influx and bioaccumulation in the downstream receiving waters of the Everglades Protection Area (EPA). Results in this attachment are based on Calendar Year 2013 (CY2013) (January 1, 2013–December 31, 2013) for atmospheric wet deposition, and Water Year 2014 (WY2014) (May 1, 2013–April 30, 2014) for total mercury (THg) in fish.

The key findings presented in this attachment are as follows:

1. Total annual wet deposition for the EPA in CY2013 was 129 kilograms of mercury per year (kg Hg/yr), which is 1.0 kg Hg higher than in CY2012. In CY2013, annual volume-weighted THg concentrations increased at two stations (FL34 and FL97).
2. Mosquitofish (*Gambusia holbrooki*) collected from downstream marsh sites had THg levels ranging from 8 nanograms per gram (ng/g) at site WCA2F1 to 125 ng/g at site ROTENC. The average basinwide concentration in WY2014 was 44 ng/g, representing a decrease of 28% from the basinwide mean concentration in WY2013. The grandmean for the period of record (POR) (WY1999–WY2014) over all basins is 65 ng/g, which is below the USEPA criterion for trophic level III fish. Same as WY2013, eleven of the twelve monitoring sites displayed decreases in THg levels. The decline in mosquitofish THg concentrations is likely associated with high rainfall in WY2014 which helped prevent soil oxidation. Soil oxidation can lead to the release of mercury, organic matter, and sulfate in the marsh area.
3. Sunfish (*Lepomis* spp.) collected from downstream sites had THg levels ranging from a minimum of 87 ng/g at site WCA2F1 to a maximum of 395 ng/g at site L67F1. The basinwide average concentration for sunfish in WY2014 was 201 ng/g, representing a 14 percent increase from WY2013. In WY2014, sunfish continued to show marked spatial variation in THg levels. Fish from sites CA2NF, WCA2U3, ROTENC, CA33ALT, CA35ALT, CA315, and L67F1, showed the highest average concentrations (ranging from 184–395 ng/g).

4. Fillets from individual largemouth bass (*Micropterus salmoides*) (LMB) were collected from eleven of the twelve downstream sites in WY2014, and had tissue THg concentrations ranging from a minimum of 139 ng/g (age 1) at site WCA2U3 to a maximum of 2,710 ng/g (age 1) at site L67F1, both of which are significantly higher than in WY2013. Site-specific, age-standardized concentrations (estimated for a three-year-old bass, EHg3) ranged from 437 ng/g at site CA2NF to 1,809 ng/g at site L67F1.
5. Collections of great egret *(Ardea alba*) feathers in WY2014 were attempted but not obtainable due to time constraints imposed by the Florida Fish and Wildlife Conservation Commission (FWC) scientific collecting permit. Since collections began in 1999, wading bird feathers were collected from thirteen locations in Water Conservation Area 3A.
6. For WY2014, average THg concentrations decreased by 28 percent in mosquitofish, increased by 14 percent in sunfish, and increased by 21 percent in largemouth bass. Data showed that the northernmost sites are still comparatively low in tissue THg concentrations in LMB. L67F1 remains the highest in LMB THg concentration. WCA2U3 displayed a slight increase in LMB THg levels. Based on guidance from the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency on mercury concentrations in fish, localized populations of fish-eating birds and mammals continue to be at potential risk from adverse effects due to mercury exposure, depending on their respective foraging areas. Consequently, most of South Florida remains under fish consumption advisories for the protection of human health.

# INTRODUCTION

This attachment is the annual permit compliance report for Calendar Year 2013 (CY2013) (January 1, 2013–December 31, 2013) for atmospheric deposition and Water Year 2014 (WY2014) (May 1 2013–April 30, 2014) for fish, summarizing the results of Hg monitoring in the downstream receiving waters of the EPA. Following the past three years of feather data collection by the University of Florida, since WY2012 the District has conducted feather collection; however, great egret (*Ardea alba*) data are not available for this reporting period due to constraints imposed by the FWC scientific collecting permit. This report, along with Attachment C of Appendix 3-1 of this volume, satisfies the mercury-related reporting requirements of the Florida Department of Environmental Protection (FDEP) Non-ECP permit (0237803).

# BACKGROUND

In 1994, the Florida legislature enacted the Everglades Forever Act [EFA; Chapter 373.4592, Florida Statutes (F.S.)], which established long-term water quality goals for the restoration and protection of the Everglades. To achieve these goals, the South Florida Water Management District (SFWMD or District) implemented the Everglades Construction Plan. A crucial element of EFA implementation was wetland construction (Everglades STAs) to reduce phosphorus loading in runoff from the Everglades Agricultural Area (EAA). The original STAs were built mainly on formerly cultivated lands within the EAA, and total over 26,000 hectares (approximately 65,000 acres, equating to approximately 45,000 acres of effective treatment area). The downstream receiving waters to be restored and protected by the EFA are part of the Everglades Protection Area (EPA).

Despite legislation and related goals, concerns were expressed that the restoration effort might inadvertently worsen the Everglades mercury problem while reducing downstream eutrophication (Mercury Technical Committee, 1991). Mercury is a persistent, bioaccumulative, toxic pollutant that can build up in the food chain to levels harmful to human and wildlife health.

Widespread elevated concentrations of mercury were first discovered in freshwater fish from the Everglades in 1989 (Ware et al., 1990). Based on the mercury levels observed in 1989, state fish consumption advisories were issued for select species and locations [Florida Department of Health and Rehabilitative Services (known as FDOH) and Florida Game and Fresh Water Fish Commission (currently the Florida Fish and Wildlife Conservation Commission, or FWC), March 6, 1989]. Subsequently, elevated concentrations of mercury have also been found in predators, such as raccoons (*Procyon lotor*), alligators (*Alligator mississippiensis*), Florida panthers (*Felis concolor*), and wading birds (Fink et al., 1999).

A key to understanding the Everglades mercury problem is recognizing that it is primarily a methylmercury (MeHg) problem, not an inorganic or elemental mercury problem. MeHg is more toxic and bioaccumulative than the inorganic or elemental form. Elsewhere in the world, industrial discharge or mine runoff (e.g., the chlor-alkali plant in Lavaca Bay in Texas, the New Idria Mine in California, and the Idrija Mercury Mine in Slovenia) can contain total mercury (THg) concentrations much greater (in some areas three-hundredfold higher) than those found in the Everglades, but at the same time have lower MeHg concentrations. In the Everglades, atmospheric loading has been found to be the dominant, proximate source of inorganic mercury, with the ultimate source likely being coal-fired utility boilers (far field) and municipal and medical waste incinerators (Atkeson and Parks, 2002). After deposition, a portion of this inorganic mercury is then converted to MeHg by sulfate-reducing bacteria (SRB) in the sediments of aquatic systems (Gilmour et al., 1992; Gilmour et al., 1998; Jeremiason et al., 2006). This methylation process is extraordinarily effective in the Everglades due to the availability of sulfate, the large pool of labile dissolved organic matter, and high mercury input from atmospheric deposition (Gilmour and Krabbenhoft, 2001; Renner, 2001; Bates et al., 2002).

To provide assurance that EFA implementation was not exacerbating the mercury problem, construction and operation permits for the STAs, issued by the FDEP, required that the District monitor the levels of THg and MeHg in various abiotic (e.g., water and sediment) and biotic (e.g., fish and bird tissues) media within both the downstream receiving waters of the EPA and in the STAs (see Volume I, Chapter 5). The downstream system is monitored to track changes in mercury concentrations over space and time in response to the changes in hydrology and water quality associated with the EFA.

# MERCURY MONITORING AND REPORTING PROGRAM

## RAINFALL

From 1992 through 1996, the District, the FDEP, the U.S. Environmental Protection Agency (USEPA), and a consortium of southeastern U.S. power companies sponsored the Florida Atmospheric Mercury Study (FAMS). The FAMS results, in comparison with monitoring of surface water inputs to the Everglades, showed that more than 95 percent of the annual mercury came from rainfall. As such, it was clear that the major source of mercury to the Everglades was from the atmosphere. Accordingly, the District continues to monitor atmospheric wet deposition of THg to the Everglades by collecting information from the National Atmospheric Deposition Program's (NADP) Mercury Deposition Network (MDN). Under MDN protocols, bulk rainfall samples are collected weekly at STA-1W (station FL34), Western Broward County (station FL97), and the ENP (station FL11) to measure wet deposition (i.e., dry deposition is not measured) (**Figure G-1**). Surface measurements at the Broward County station began at the end of November 2006, replacing the former Andytown station (FL04).

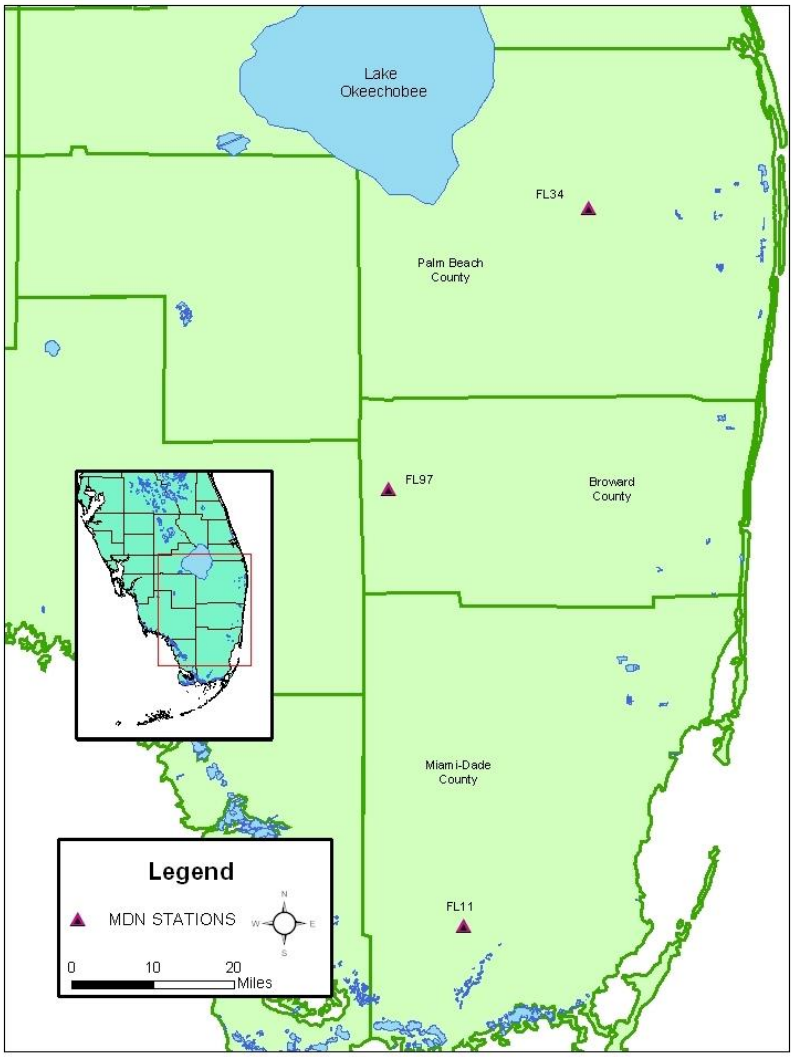



**Figure G-1.** Mercury Deposition Network sites in South Florida.

## PREYFISH

Grab samples of 100 to 250 mosquitofish (*Gambusia* spp.) were collected with a dip net during single sampling events at 12 downstream interior marsh sites **(Figure G-2)**. Mosquitofish are selected as a representative indicator of short-term, localized changes in water quality because of their small size range, short lifespan, and widespread occurrence in the Everglades. Mosquitofish become sexually mature at approximately three weeks of age and have an average life span of only four to five months (though some individual females may live up to 1.5 years); the life span of males is shorter than females (Haake and Dean, 1983; Haynes and Cashner, 1995; Cabral and Marques, 1999). After collection, the mosquitofish are homogenized, the homogenate is sub-sampled into aliquots, and each aliquot is analyzed for THg. On March 5, 2002, the FDEP approved a reduction in the number of aliquots of the homogenate from five to three (correspondence from F. Nearhoof, FDEP). In March 2007, the District revised its use of three aliquots to one aliquot. In October 2007, the District began analyzing THg for all fish types (mosquitofish and large-bodied fish) that do not require pesticide analysis. Samples requiring both mercury and pesticide analysis are analyzed by the FDEP.

## SECONDARY PREDATOR FISH

Up to 20 sunfish (*Lepomis* spp.) were collected at the same 12 downstream interior marsh sites using electroshocking techniques (**Figure G-2**). Sunfish are thought to have an average lifespan of four to seven years in the wild. Each whole fish is analyzed for THg. Sunfish are prevalent in the Everglades and are the preferred prey for several fish-eating species; therefore, this species was selected as an indicator of mercury exposure for wading birds and other fish-eating wildlife.

## TOP PREDATOR FISH

Using electroshocking techniques, up to 20 largemouth bass (*Micropterus salmoides*) (LMB) were collected at the 12 downstream interior marsh sites (**Figure G-2**), and their fillets were analyzed for THg. Largemouth bass are long-lived (the oldest bass collected as part of this effort was nine years old) and have been monitored at several Everglades sites since 1989. Therefore, LMB were selected as an indicator of potential human exposure to mercury.

Tissue concentrations in each of these three monitored fish species reflect ambient MeHg levels; i.e., their exposure is a function of a combination of factors, including body size, age, rate of biomass turnover, and trophic position. Mosquitofish should respond rapidly to changing ambient MeHg concentrations due to their small size, lower trophic status, short life span, and rapid biomass turnover. Conversely, sunfish and LMB should take a greater amount of time to respond, in terms of tissue concentrations, to changes in ambient MeHg availability. Most importantly, sunfish and LMB represent exposure at higher trophic levels (TLs) with a requisite time lag for trophic exchange. While focusing on three-year-old bass is appropriate to evaluate exposure to fishermen, it complicates the data results by only interpreting tissue concentration integrated over a three-year period. The key is to use these species-related differences to better assess MeHg availability within the system.

More than 85 percent of the mercury found in the muscle tissue of fish is in the methylated form (Grieb, et al., 1990; Bloom, 1992). Therefore, the analysis of fish tissue for THg, which is a more straightforward and less costly procedure than the analysis for MeHg, can be interpreted as being equivalent to the analysis of MeHg.

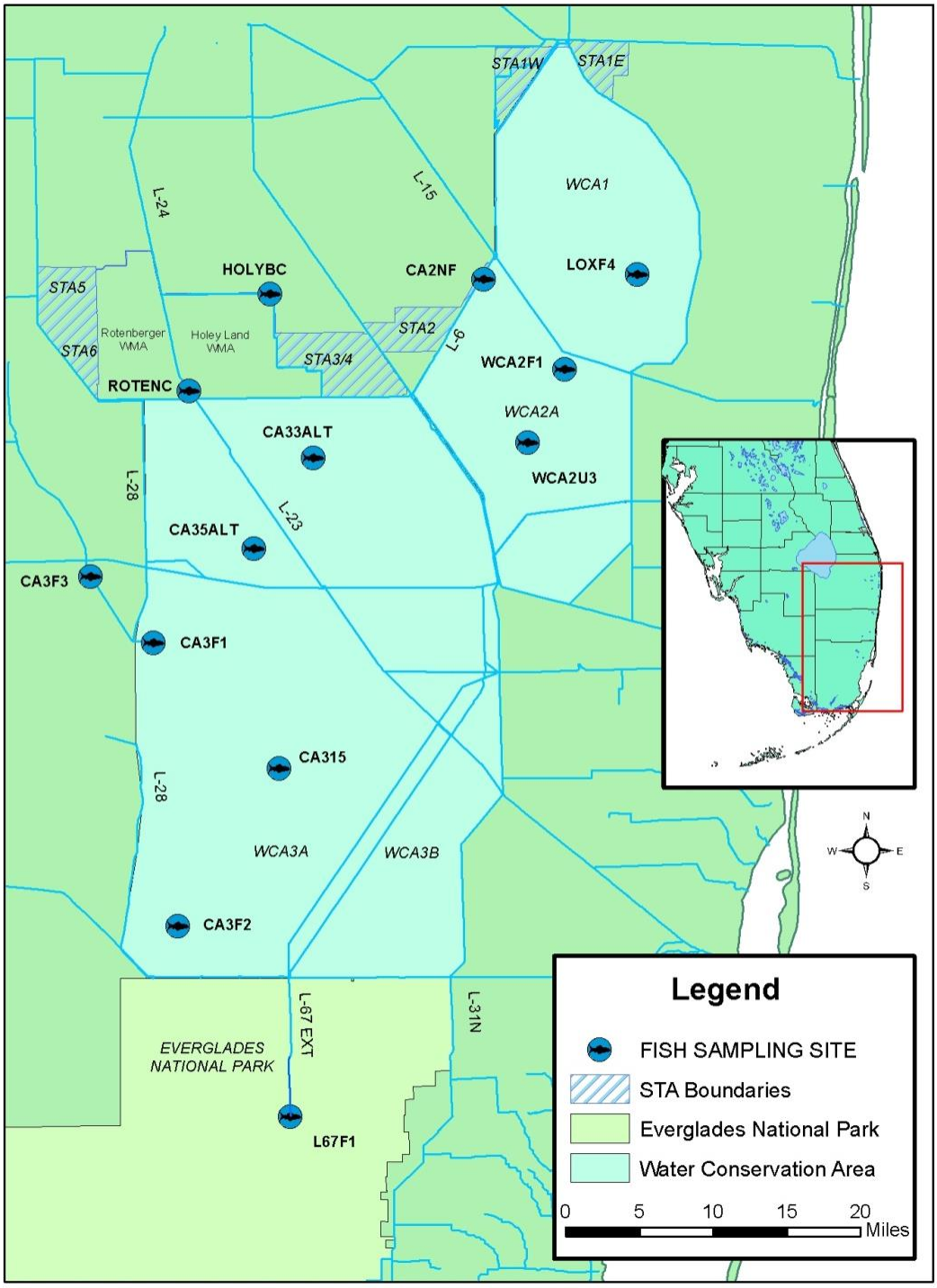



**Figure G-2.** Collection sites for monitoring total mercury (THg) levels in mosquitofish (*Gambusia* spp.), sunfish (*Lepomis* spp.), and largemouth bass (*Micropterus salmoides*). CA3F1 was replaced with CA3F3 in WY2011 due to the difficulty of accessing CA3F1, which is located in Tribal Land. CA3F3 is located in the L-28 Interceptor Canal within the Big Cypress National Preserve. Monitoring at CA3F3 began on 10/7/2010. The District has been unable to request a modification to Non-ECP Permit 0237803-11 to formally replace station CA3F1 with CA3F3, because the permit is on administrative hold until litigation issues are resolved.

## FEATHERS

To monitor temporal trends in mercury bioaccumulation of fish-eating wildlife, the District collects feathers from great egret nestlings. The District's monitoring program has focused on two egret colonies, designated as JW1 and L67, which are located in WCA-3A (**Figure G-3**). These two colonies consistently showed the highest THg concentrations during background studies (Frederick et al., 1997; FTN Associates, 1999; Sepulveda et al., 1999). However, nesting at the JW1 colony has been erratic in recent years and, consequently, samples have been collected from another nearby colony designated Cypress City (**Figure G-3**). Under appropriate state and federal permits, feathers are collected (for THg analysis) from the oldest nestling in 10 nests in each of the two different nesting colonies. This sampling design (approved in permit modification 0237803-10, Exhibit E) is consistent with protocols used in the collection of background data (Frederick et al., 1997). From CY2009–CY2011, the District contracted the University of Florida (UF) to conduct annual juvenile great egret feathers collections. During that period, UF researchers collected or attempted collection of feathers from the traditional District sites (Alley North, L67F1, Cypress City, and JW1), with additional collections from other areas within the WCAs (**Figure G-3**), as presented in previous permit reports. All sampling locations can be used for the purpose of evaluating spatial and temporal THg trends in juvenile great egrets. Since CY2012, the District brought annual juvenile great egret feather collection back in-house; however, feather data for mercury analysis is not available for this reporting period due to constraints imposed by the FWC scientific collecting permit that was issued to the District. In addition to the monitoring program described above, in accordance with Condition 4.iv of the Mercury Monitoring Program, the District is required to "report changes in wading bird habitat and foraging patterns using data collected in ongoing studies conducted by the permittee and other agencies." Further details regarding rationales for the sampling scheme, procedures, and data reporting requirements are in the District's Everglades Mercury Monitoring Plan, revised in March 1999 (Appendix 1 of the Quality Assurance Protection Plan, June 7, 1999). Information about wading bird nesting activity is provided in Volume I, Chapter 6.

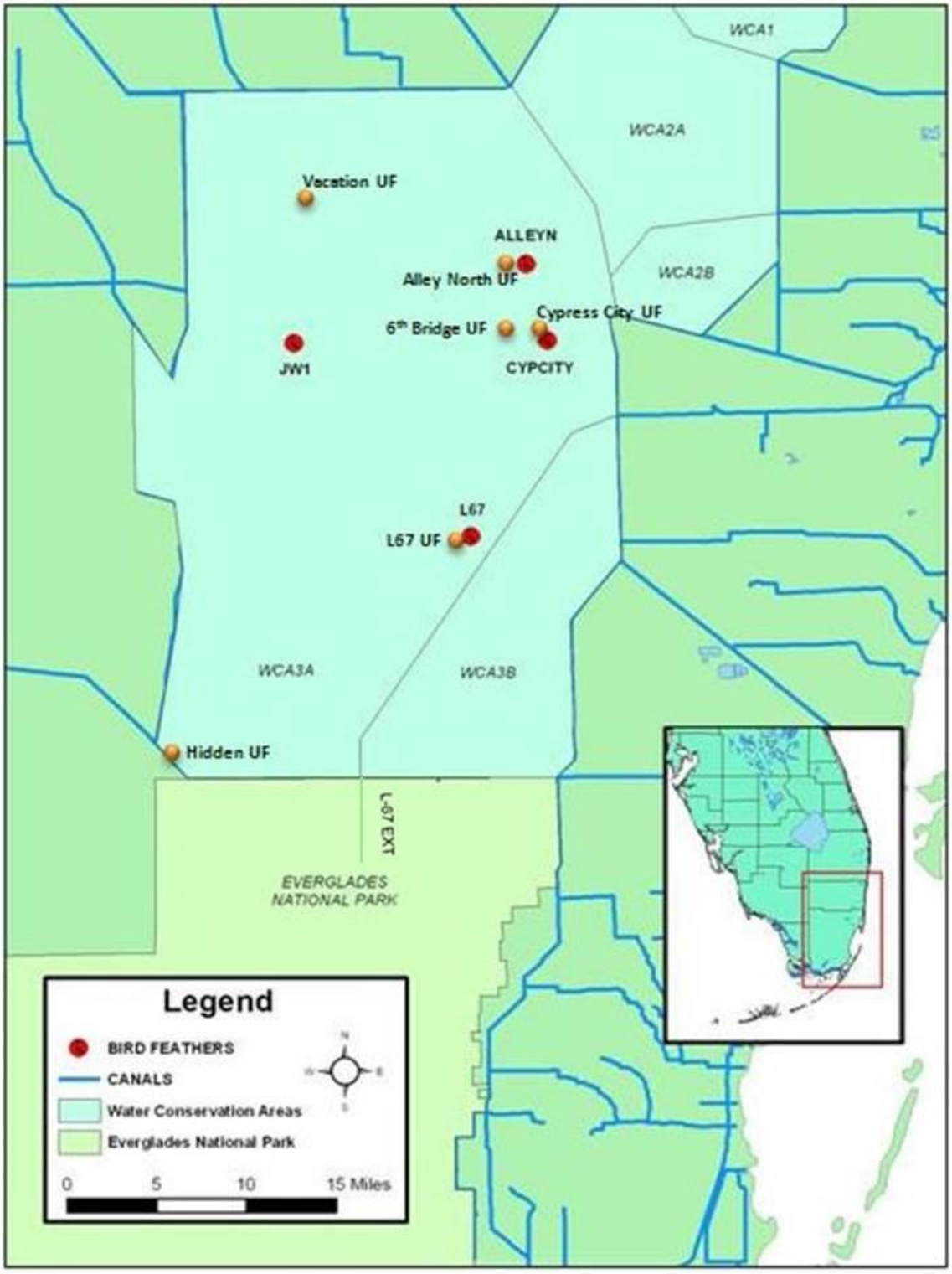



**Figure G-3.** Collection sites for great egret (*Ardea alba*) nestling feathers. Although efforts to collect repeatedly from the same colony are made, colonies are sometimes inactive or abandoned, thus requiring collection at an alternate colony.

## QUALITY ASSESSMENT FOR THE MERCURY MONITORING PROGRAM

Details on all quality assurance and quality control measurements for data collected under the EFA permits are provided in Attachment C of Appendix 3-1 of this volume.

## STATISTICAL METHODS

Temporal trends in atmospheric THg deposition were evaluated using the Seasonal Kendall test (SAS; for macro, see USEPA, 1993), which is a generalization of the Mann-Kendall trend test for trend detection (Gilbert, 1987). The test is applied to datasets exhibiting seasonality, and may be used even though there are missing, tied, or non-detect values.

Monitoring mercury concentrations in aquatic animals provides several advantages. However, interpretability of residue levels in animals can be problematic due to the confounding influences of age or species. For comparative purposes, special procedures are used to normalize the data. Standardization to size, age, or lipid content is a common practice (Wren and MacCrimmon, 1986; Hakanson, 1980). To be consistent with the reporting protocol used by the FWC (Lange, et al., 1998; 1999), Hg concentrations in LMB were standardized to an expected mean concentration in three-year-old fish (EHg3) at a given site by regressing Hg on age (Lange et al., 1999). Because sunfish were not aged, age normalization was not available. Instead, arithmetic means were reported. However, efforts were made to estimate a least square mean (LSM) THg concentration based on the weight of the fish. Additionally, the distribution of the different species of sunfish, including warmouth (*L. gulosus*), spotted (*L. punctatus*), bluegill (*L. macrochirus*), and redear (*L. microlophus*), collected during electroshocking was also considered to be a potential confounding influence on THg concentrations prior to each comparison. To be consistent with the reporting protocol of Frederick et al. (1997; see also Sepulveda et al., 1999), THg concentrations in egret nestling feathers were similarly standardized for each site and were expressed as LSM for chicks with a 7.1 centimeter (cm) bill.

SigmaPlot (current version) software was used as the main statistical tool for data analysis. Data sets were first tested for equal variance and normal distribution. Assumptions of normality and equal variance were tested using the Kolmorogov-Smirnov and Levene Median tests, respectively. Datasets that either lacked homogeneity of variance or departed from normal distribution were natural-log transformed and reanalyzed. If transformed data met the assumptions, then they were used in standard analysis of variance (ANOVA). If the assumptions were not met, then the raw datasets were evaluated using non-parametric Mann-Whitney or Kruskal-Wallis Rank sum tests. If the multigroup null hypothesis was rejected, then groups were compared using either Nemenyi test (for equal-sized datasets) or Dunn's Method (for unequal-sized datasets). Pearson Product moment (or the non-parametric equivalent Spearman Rank Order) was used to evaluate the relationship between two parameters. Linear regression was used to develop a line of best fit (linear model) between two parameters.

# MONITORING RESULTS

## RAINFALL: NATIONAL ATMOSPHERIC DEPOSITION PROGRAM, MERCURY DEPOSITION NETWORK

Samples of rainfall were collected weekly under the protocols of the National Atmospheric Deposition Program (NADP) Mercury Deposition Network (MDN) at STA-1W (FL34), the Baird Research Center in the Park (FL11), and the Western Broward County station (FL97) (**Figure G-1**). For more information on MDN and to retrieve raw data, see nadp.sws.uiuc.edu/mdn. In 2004, difficulties were encountered due to the landfall of four hurricanes (Rumbold et al., 2006); in 2005, the pattern and difficulties continued with the landfall or near misses of three hurricanes. In 2004, the northernmost station, STA-1W, was most affected; in 2005, the southern station, ENP, was most significantly affected by the storms. During these events, the collectors recorded significant precipitation with little THg. All three collectors were non-functioning during Hurricane Wilma in 2005. Therefore, among-year differences in both volume-weighted concentration and deposition should be considered with these uncertainties. Missing samples at each station were due to a combination of no precipitation and mechanical failure.

Notwithstanding the uncertainties caused by tropical rainfall events and periodic mechanical failures, wet atmospheric deposition of THg to South Florida continues to be highly variable both spatially and temporally (**Table G-1**; **Figures G-4** and **G-5**). As observed in previous years, THg concentrations in precipitation were substantially higher during the summer months (**Figure G- 4**), likely due to seasonal and tall, convective thunderclouds that can scavenge particulate mercury and water-soluble reactive gaseous mercury from the middle and upper troposphere. This is commonly understood, as observed with several studies, e.g., Guentzel (1997); Lai et al. (2007); Selin and Jacob (2008). Because both THg concentrations and rainfall volumes generally increase during summer, THg wet deposition typically peaks in mid-summer (**Figure G-4**).

In CY2013, the annual volume-weighted THg concentration was highest in the central site (FL97) and lowest in the south site (**Table G-2**). This is different from the north-south decreasing pattern seen in CY2012. The average of the three stations in CY2013 was 13.3 ng/L, which is slightly higher than the average (12.6 ng/L) in CY2012. Annual THg deposition tracked annual precipitation depth closely (**Figure G-4**), and was highest at the north site (**Table G-3**). Compared to CY2012, annual deposition decreased by 0.8 $\mu g/m^2$ in site FL34, and by 2.0 $\mu g/m^2$ in FL11, and increased 3.7 $\mu g/m^2$ at FL97 (**Table G-3**).

Based on the average deposition rates measured at the three sites, wet-only atmospheric loading of THg to the EPA ($7{,}448 \times 10^9$ $m^2$) was estimated at 129 kilograms of mercury per year (kg Hg/yr), which is 1 kg Hg/yr higher than the annual deposition rate observed in CY2012 (**Table G-4**). While the focus is only on wet deposition, dry deposition likely adds 30 to 60 percent of wet deposition to the overall atmospheric load (FDEP, 2003; Marsik, et al., 2007). It should be noted that the estimate of 129 kg Hg/yr has uncertainty, because mechanical failure or collection efficiency issues are associated with several samples.

Seasonal Kendall analyses (of ranks) revealed a significant decreasing trend in monthly mean THg concentrations at FL34 (1998–2013; n = 204 months; Tau = -0.159; p = 0.006); however, there was no trend for FL11 (1997–2013; n = 204 months; Tau = -0.022; p = 0.675) or FL04/97 (2007–2013; n = 192 months; Tau = -0.038; p = 0.487). Mercury deposition shows no significant trend for FL34 and FL04/FL97 (all p>0.05). However, a significant decreasing trend of mercury deposition was found at FL11 (Tau=-0.121, n=204 months, p=0.019). There is no significant trend for monthly total rainfall at all sites for the POR (all p> 0.05).

**Table 1.** THg concentrations (nanograms per liter (ng/L); wet only) at the compliance sites of the Mercury Deposition Network (MDN) in CY2013.

| Site | Week Ending | THg (ng/L) | Site | Week Ending | THg (ng/L) | Site | Week Ending | THg (ng/L) |
|---|---|---|---|---|---|---|---|---|
| FL34 | 1/8/2013 | 9.24 | FL97 | 1/8/2013 | -- | FL11 | 1/3/2012 | -- |
| FL34 | 1/15/2013 | 3.92 | FL97 | 1/15/2013 | 10.46 | FL11 | 1/10/2012 | 7.3 |
| FL34 | 1/22/2013 | -- | FL97 | 1/22/2013 | 5.23 | FL11 | 1/17/2012 | 3.46 |
| FL34 | 1/29/2013 | -- | FL97 | 1/29/2013 | -- | FL11 | 1/24/2012 | -- |
| FL34 | 2/5/2013 | -- | FL97 | 2/5/2013 | -- | FL11 | 1/31/2012 | -- |
| FL34 | 2/12/2013 | -- | FL97 | 2/12/2013 | 42.04 | FL11 | 2/7/2012 | -- |
| FL34 | 2/19/2013 | 7 | FL97 | 2/19/2013 | 7.95 | FL11 | 2/14/2012 | 6.83 |
| FL34 | 2/26/2013 | 16.48 | FL97 | 2/26/2013 | 14.27 | FL11 | 2/21/2012 | -- |
| FL34 | 3/5/2013 | 8.45 | FL97 | 3/5/2013 | 5.1 | FL11 | 2/28/2012 | 11.53 |
| FL34 | 3/12/2013 | -- | FL97 | 3/12/2013 | -- | FL11 | 3/6/2012 | -- |
| FL34 | 3/19/2013 | 6.47 | FL97 | 3/19/2013 | 15.46 | FL11 | 3/13/2012 | 14.21 |
| FL34 | 3/26/2013 | 11.77 | FL97 | 3/26/2013 | 21.23 | FL11 | 3/20/2012 | 13.51 |
| FL34 | 4/2/2013 | -- | FL97 | 4/2/2013 | 18.23 | FL11 | 3/27/2012 | -- |
| FL34 | 4/9/2013 | 11.16 | FL97 | 4/9/2013 | 15.45 | FL11 | 4/3/2012 | 8.81 |
| FL34 | 4/16/2013 | 9.92 | FL97 | 4/16/2013 | 12.92 | FL11 | 4/10/2012 | -- |
| FL34 | 4/23/2013 | 22.15 | FL97 | 4/23/2013 | 13.47 | FL11 | 4/17/2012 | 7.61 |
| FL34 | 4/30/2013 | 30.24 | FL97 | 4/30/2013 | -- | FL11 | 4/24/2012 | 11.51 |
| FL34 | 5/7/2013 | 12.22 | FL97 | 5/7/2013 | 11.34 | FL11 | 5/1/2012 | 11.98 |
| FL34 | 5/14/2013 | 16.12 | FL97 | 5/14/2013 | 13.14 | FL11 | 5/8/2012 | 10.64 |
| FL34 | 5/21/2013 | 7.71 | FL97 | 5/21/2013 | 19.38 | FL11 | 5/15/2012 | 12.83 |
| FL34 | 5/28/2013 | 6.99 | FL97 | 5/28/2013 | 24.71 | FL11 | 5/22/2012 | 7.19 |
| FL34 | 6/4/2013 | 8.57 | FL97 | 6/4/2013 | 18.68 | FL11 | 5/29/2012 | 3.86 |
| FL34 | 6/11/2013 | 9.94 | FL97 | 6/11/2013 | 12.87 | FL11 | 6/5/2012 | 14.66 |
| FL34 | 6/18/2013 | 27.12 | FL97 | 6/18/2013 | 30.93 | FL11 | 6/12/2012 | 17.5 |
| FL34 | 6/26/2013 | 21.68 | FL97 | 6/25/2013 | 26.48 | FL11 | 6/19/2012 | 9.81 |
| FL34 | 7/2/2013 | 16.85 | FL97 | 7/2/2013 | 22.88 | FL11 | 6/26/2012 | 22.09 |
| FL34 | 7/9/2013 | 11.76 | FL97 | 7/9/2013 | 16.94 | FL11 | 7/3/2012 | 7.41 |
| FL34 | 7/17/2013 | 15.98 | FL97 | 7/16/2013 | 9.6 | FL11 | 7/10/2012 | 11.6 |
| FL34 | 7/23/2013 | 16.48 | FL97 | 7/23/2013 | 15.26 | FL11 | 7/17/2012 | 3.87 |
| FL34 | 7/30/2013 | 27.14 | FL97 | 7/30/2013 | 24.21 | FL11 | 7/24/2012 | 9.66 |
| FL34 | 8/6/2013 | 15.77 | FL97 | 8/6/2013 | 24.06 | FL11 | 7/31/2012 | 29.08 |
| FL34 | 8/13/2013 | 14.32 | FL97 | 8/13/2013 | 9.5 | FL11 | 8/7/2012 | 12.82 |
| FL34 | 8/20/2013 | 3.32 | FL97 | 8/20/2013 | 28.68 | FL11 | 8/14/2012 | 14.58 |
| FL34 | 8/27/2013 | 24.61 | FL97 | 8/27/2013 | 21.27 | FL11 | 8/21/2012 | 27.68 |
| FL34 | 9/3/2013 | 13.71 | FL97 | 9/3/2013 | 30.61 | FL11 | 8/28/2012 | 8.37 |
| FL34 | 9/10/2013 | 19.65 | FL97 | 9/10/2013 | 17.77 | FL11 | 9/4/2012 | 23.54 |
| FL34 | 9/17/2013 | 10.27 | FL97 | 9/17/2013 | 16.49 | FL11 | 9/11/2012 | 9.54 |
| FL34 | 9/24/2013 | 13.37 | FL97 | 9/24/2013 | 15.36 | FL11 | 9/18/2012 | 12.03 |
| FL34 | 10/1/2013 | 12.91 | FL97 | 10/1/2013 | 11.58 | FL11 | 9/25/2012 | 6.98 |
| FL34 | 10/8/2013 | 11.01 | FL97 | 10/8/2013 | 14.49 | FL11 | 10/2/2012 | 23.73 |
| FL34 | 10/15/2013 | 16.47 | FL97 | 10/15/2013 | -- | FL11 | 10/9/2012 | 25.56 |
| FL34 | 10/22/2013 | -- | FL97 | 10/22/2013 | 20.32 | FL11 | 10/16/2012 | 8.75 |
| FL34 | 10/29/2013 | -- | FL97 | 10/29/2013 | 23.96 | FL11 | 10/23/2012 | 3.9 |
| FL34 | 11/5/2013 | -- | FL97 | 11/5/2013 | 6.91 | FL11 | 10/30/2012 | 1.64 |
| FL34 | 11/12/2013 | 2.6 | FL97 | 11/12/2013 | 1.44 | FL11 | 11/6/2012 | 11.73 |
| FL34 | 11/19/2013 | 4.7 | FL97 | 11/19/2013 | -- | FL11 | 11/13/2012 | 4.57 |
| FL34 | 11/26/2013 | 5.97 | FL97 | 11/26/2013 | 17.75 | FL11 | 11/20/2012 | 7 |
| FL34 | 12/3/2013 | 6.7 | FL97 | 12/3/2013 | 7.1 | FL11 | 11/27/2012 | 1 |
| FL34 | 12/10/2013 | -- | FL97 | 12/10/2013 | -- | FL11 | 12/4/2012 | 1.5 |
| FL34 | 12/17/2013 | -- | FL97 | 12/17/2013 | -- | FL11 | 12/11/2012 | -- |
| FL34 | 12/31/2013 | -- | FL97 | 12/31/2013 | -- | FL11 | 12/18/2012 | 2.1 |

FL34: STA-1W; FL97: Broward County; FL11: Everglades National Park (ENP); --: no data available due to lack of precipitation.

**Table G-2.** Historic volume-weighted THg concentration (ng/L) from the compliance sites of the Mercury Deposition Network (MDN) in South Florida.

| Calendar Year | STA-1W (FL34) | Broward (FL97) | ENP (FL11) |
|---|---|---|---|
| 1997* | 18.7 | NA | 14.7 |
| 1998* | 11.4 | 13.8[b] | 12.7 |
| 1999* | 10.8 | 12.3[b] | 11.6 |
| 2000* | 13.7 | 15.8[b] | 13.6 |
| 2001* | 13.9 | 13.2[b] | 13.1 |
| 2002* | 12.3 | 14.2[b] | 12.1 |
| 2003* | 16.1 | 16.4[b] | 16.4 |
| 2004* | 13.7[a] | 14.7[b] | 14.7 |
| 2005* | 11.7 | 13.7[b] | 10.6 |
| 2006* | 12.6 | 14.9[c] | 12.4 |
| 2007 | 11.8 | 11.3 | 14.5 |
| 2008 | 10.8 | 13.5 | 13.7 |
| 2009 | 12.6 | 14.9 | 14.8 |
| 2010 | 14.6 | 13.9 | 11.4 |
| 2011 | 10.1 | 13.8 | 13.5 |
| 2012 | 13.7 | 12.8 | 11.3 |
| 2013 | 13.9 | 15.3 | 10.7 |

* Adapted from 2008 South Florida Environmental Report – Volume I

**Table G-3.** Annual mercury deposition (µg/m$^2$) from the compliance sites of the Mercury Deposition Network (MDN) in south Florida.

| Calendar Year | STA-1W (FL34) | Broward (FL97) | ENP (FL11) |
|---|---|---|---|
| 1997* | 32.4 | NA | 27.2 |
| 1998* | 26.1 | 20.10[b] | 20.3 |
| 1999* | 12.1 | 17.50[b] | 17.7 |
| 2000* | 14.3 | 18.10[b] | 20 |
| 2001* | 21 | 21.10[b] | 18 |
| 2002* | 10.3[a] | 18.70[b] | 18.2 |
| 2003* | 17.8 | 28.50[b] | 26.8 |
| 2004* | a | 18.30[b] | 18.7 |
| 2005* | 11.5 | 14.50[b] | 17.5 |
| 2006* | 14.4 | NA[a,c] | 15.4 |
| 2007 | 13.5 | 22.3 | 16.8 |
| 2008 | 17.8 | 24.7 | 21.9 |
| 2009 | 15.7 | 17.55 | 22.8 |
| 2010 | 21.5 | 17.0 | 15.7 |
| 2011 | 12.7 | 17.1 | 18.5 |
| 2012 | 21.3 | 12.9 | 17.2 |
| 2013 | 20.5 | 16.4 | 15.2 |

*Adapted from 2008 South Florida Environmental Report – Volume I

a Rain gauge malfunction in 2004; several trips missed because of highly active tropical season (four hurricanes)

NA – Not available due to mechanical problems with collector, failure to meet quality control criteria, or no precipitation

NA[a] – No calculation due to (1) discontinuation of station FL04 and (2) not enough data existed for station FL97 to calculate annual deposition

NA[b] – Data just from the Andytown station (FL04)

NA[c] – Combination of data from the Andytown (FL04) and the Broward County stations (FL97)

**Table G-4.** Atmospheric THg loading to the Everglades Protection Area (EPA). Except CY1994 and 1995 as noted, all estimates were based on an average annual loading from FL34, FL11, and FL97 whenever available (see **Table G-3**) and a total area of EPA of 7,448 $km^2$ excluding Florida Bay.

| Calendar Year | Atmospheric Deposition (kg Hg/yr) |
|---|---|
| 1994[a] | 238 |
| 1995[a] | 206 |
| 1997 | 222 |
| 1998 | 173 |
| 1999 | 111 |
| 2000 | 128 |
| 2001 | 145 |
| 2002 | 136 |
| 2003 | 166 |
| 2004 | 139 |
| 2005 | 108 |
| 2006 | 111 |
| 2007 | 131 |
| 2008 | 160 |
| 2009 | 139 |
| 2010 | 134 |
| 2011 | 120 |
| 2012 | 128 |
| 2013 | 129 |

[a] USEPA (2001, as cited by FDEP, 2003) annual deposition derived from Florida Atmospheric Mercury Study (FAMS), 1993–1996; surface water loading derived from biweekly monitoring of "into" structures discharging from the EAA into the EPA.

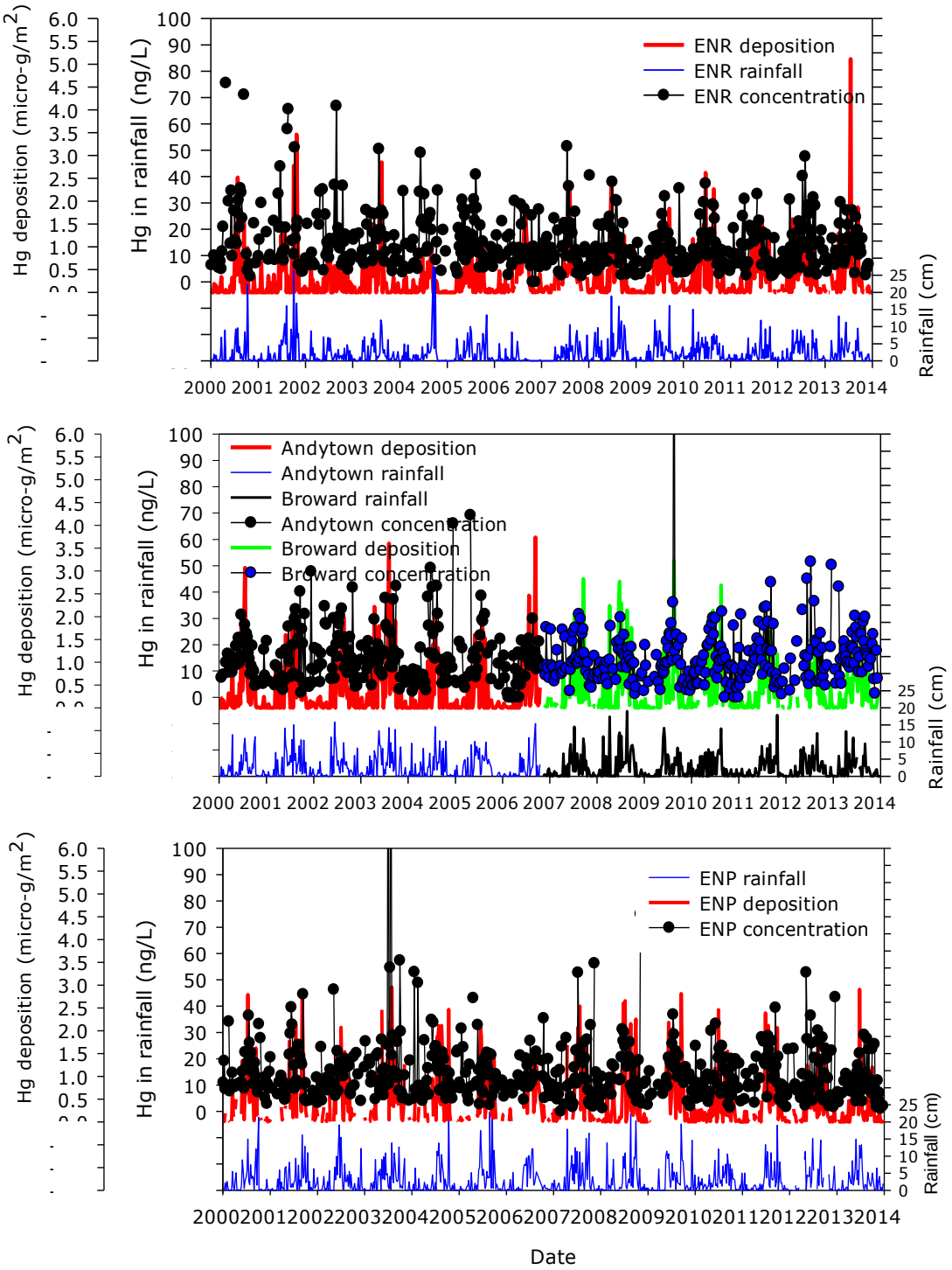



**Figure G-4.** Time series of rainfall, rainfall Hg concentrations, and wet Hg deposition at STA-1W (FL34), Andytown (FL04), Everglades National Park (ENP) Bair Research Center (FL11), and Broward County (FL97), as reported by the MDN. STA-1W (FL34) is the same site as ENR.

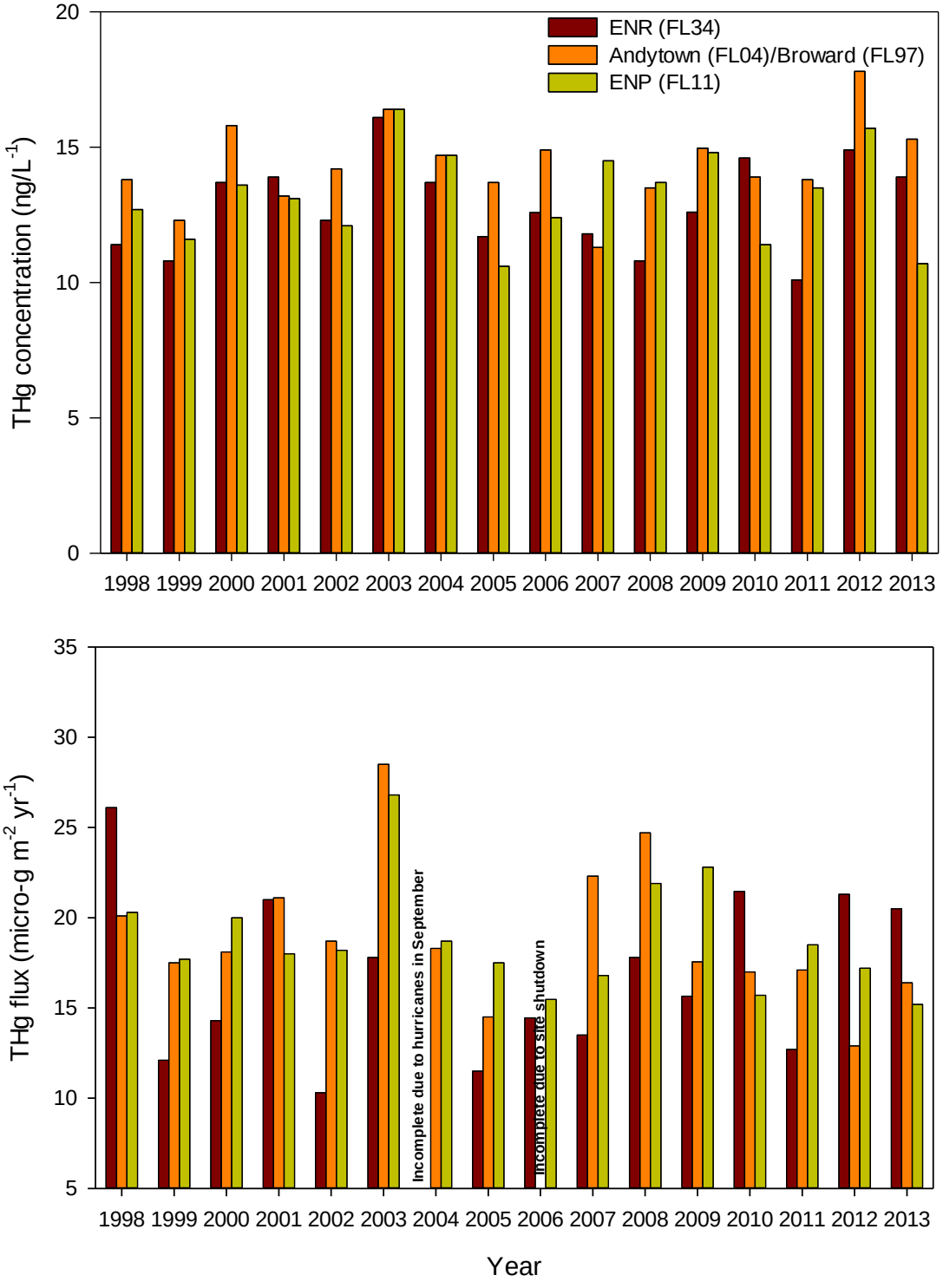



**Figure G-5.** Time series of annual volume-weighted concentration (top) and annual THg flux (bottom) at three MDN stations. The Andytown site FL04 closed down in mid-2006 and was replaced with Broward County site FL97. STA-1W (FL34) is the same site as ENR.

## FISH FROM NON-ECP INTERIOR MARSHES

Results from monitoring downstream interior marsh mosquitofish, sunfish, and LMB are summarized in **Tables G-5** through **G-7**, respectively. Raw data for individual fish are available on the District's website at www.sfwmd.gov/dbhydro. In WY2014, 12 downstream marsh sites in the interior of the WCAs and the ENP (**Figure G-2**) were targeted for fish collection. Three of these sites (LOXF4, WCA2U3, and CA315) have been monitored by the FWC since 1993. If fish could not be collected from a targeted marsh site due to inaccessibility, poor habitat, or both, then collections defaulted to nearby marshes or, in some cases, canals where fish were more plentiful, if source water was similar (approval for these alternate sites was received from the FDEP on March 5, 2002; correspondence from F. Nearhoof, FDEP). To preserve long-term datasets crucial for temporal trend assessment, reverting to the original target site will involve sampling at both the alternate and the original site for some period to assess spatial differences. Accordingly, sampling will revert to the original targeted site only after it has been established that long-term hydrologic and habitat restoration has occurred so that chances of finding fish year-to-year are high. Although this level of restoration may take several years at certain sites (e.g., WCA2F1, CA33ALT, and CA35ALT), waiting until fish are present consistently will prevent alternating collections between the two sites and the concomitant disruption of data continuity.

Fish collected in WY2014 showed both spatial and temporal patterns in tissue mercury concentrations. The focus of mercury in fish data is on temporal changes to assess possible adverse effects from the EFA construction components and STA operations. Nevertheless, spatial patterns of tissue mercury concentrations are important, particularly if there has been a variation from pre-EFA conditions established by the FWC. Therefore, spatial patterns are reviewed in detail only where significant changes have occurred over time.

**Table G-5.** THg concentrations in (ng/g) wet weight in mosquitofish composites collected in WY2013-WY2014 from 12 downstream sites. Each value represents the concentration of a single aliquot.

| Site | WY2013 | WY2014 | Between Year Change (%) | Cumulative Mean |
|---|---|---|---|---|
| LOXF4 | 71 | 30 | -58 | 65 |
| WCA2F1 | 10 | 8 | -20 | 12 |
| CA2NF | 29 | 18 | -38 | 25 |
| HOLYBC | 49 | 35 | -29 | 43 |
| ROTENC | 22 | 125 | 5 | 84 |
| WCA2U3 | 194 | 75 | -61 | 137 |
| CA33ALT | 47 | 24 | -49 | 60 |
| CA35ALT | 146 | 69 | -53 | 101 |
| CA3F1 | 67 | 26 | -61 | 47 |
| CA315 | 50 | 53 | -6 | 85 |
| CA3F2 | 22 | 15 | -32 | 48 |
| L67F1 | 89 | 47 | -47 | 85 |
| Annual Mean | 66 | 44 | -33 | 66 |

*[(2014–2013)/2014]*100

Note: Grandmean for period of record (POR) (WY1999–2014; aliquots pooled across time and space)

± 95% C.I. of mean: n = 539; 65 ± 5 ng/g; 50th, 75th, and 90th percentiles for POR were 52, 82, and 140 ng/g, respectively

† Mean includes dropped stations no longer under permit

**Table G-6.** Total mercury (THg = mean±SD, n) in sunfish (*Lepomis* spp.) collected in WY2013 and WY2014 downstream of the Stormwater Treatment Areas (STAs). Mean= nanograms per gram (ng/g) wet weight; SD=standard deviation, n=number of sample (fish).

| Site | WY2013 | WY2014 | Between-Year-Change (%) [$] | Cumulative Mean |
|---|---|---|---|---|
| LOXF4 | 178±75, 20 | 122±42,20 | -45 | 133 |
| WCA2F1 | ND | 13,2 | ND | 46 |
| CA2NF | 97±51, 20 | 184±224,20 | 47 | 119 |
| WCA2U3 | 241±115, 20 | 292±121,20 | 17 | 216 |
| HOLYBC | 88±56, 20 | 120±65,20 | 27 | 145 |
| ROTENC | 130±47, 20 | 227±105,20 | 42 | 203 |
| CA33ALT | 140±22, 20 | 244±172,20 | 43 | 212 |
| CA35ALT | 284±138, 20 | 372±177,20 | 24 | 265 |
| CA3F1/F3 | 95±62, 20 | 87±39,20 | -9 | 118 |
| CA315 | 278±279, 20 | 240±98,20 | -16 | 276 |
| CA3F2 | 124±53, 20 | 113±66,20 | -10 | 123 |
| L67F1 | 249±116, 20 | 395±280,20 | 37 | 390 |
| **Annual Mean** | 173 | 201 | 14 | 187 |

[$] [(2014–2013)/2014]*100

NA – Data not available due to low water level or no fish available

Note: Grandmean for period of record (POR) (WY1999–2014)

± 95% C.I. of mean: n = 3439; 188 ± 6 ng/g; 50th, 75th, and 90th percentiles for POR were 140, 241, and 380 ng/g, respectively

† Mean includes dropped stations no longer under permit

## Mosquitofish

THg levels in mosquitofish collected from marsh sites in WY2014 ranged from 8 nanograms per gram (ng/g) at site WCA2F1 to 125 ng/g at site ROTENC (**Table G-5**; **Figure G-6**). Both minimum and maximum THg concentrations are less than those in WY2013. The average annual basinwide THg concentration in mosquitofish collected in WY2014 was 44 ng/g (**Table 5**; **Figure G-6**), which is 18 ng/g (or 33%) lower than the basinwide mean concentration in WY2013 (66 ng/g). The mean aliquot for tissue THg concentrations in mosquitofish for the POR (WY1999–WY2014; n = 539) was 65 ng/g. Similar to WY2013, most stations showed decreases in mosquitofish THg concentrations (**Table G-5**). Historically, mosquitofish THg concentrations were often the highest in WCA2U3, with an average of 137 ng/g. However, mosquitofish THg concentration at WCAU3 decreased from 194 ng/g in WY2013 to 75 ng/g in WY2014. By contrast, mosquitofish THg concentration in ROTENC increased from 22 ng/g in WY2013 to 125 ng/g in WY2014. **Figure G-7** shows that the spatial variability in mean mosquitofish THg levels is relatively high. A few stations reveal consistently low (e.g., WCA2F1, CA2NF, and CA3F2) or high (WCA2U3 and L67F1) levels. Several sites displayed marked changes in THg concentration in WY2014. However, none of the sites have shown statistically significant increases in THg level (Spearman Rank correlation, all $p>0.05$). The average THg concentrations in mosquitofish for the POR and WY2014 were below USEPA Trophic Level 3 (TL3) fish criterion (77 ng/g) for protection of wildlife.

Since WY2006, when samples were collected from all 12 sites, the change in mosquitofish THg concentrations within sites between two consecutive years was high. For example, THg concentration in the interior site (WCA2U3) of WCA-2 in WY2012 was highest (370 ng/g) for the POR, but decreased to 190 ng/g in WY2013, and further decreased to 75 ng/g in WY2014. By contrast, THg concentration in mosquitofish collected from ROTENC was 20 ng/g in WY2013, but increased to 125 ng/g in WY2014, which represents over an order of magnitude increase. It is not clear what factor(s) control the dramatic temporal variations in mosquitofish THg concentration within sites. Changes in prey availability, biochemical interactions or a combination of these factors could potentially influence an important role on controlling THg concentration in mosquitofish. Moreover, mosquitofish can vary in trophic level depending on age, habitat, and diet (Williams and Trexler, 2006) which can profoundly impact variability across the landscape. Low THg concentrations (i.e., less than 77 ng/g) in mosquitofish were found in wet years (WY2000, WY2002–WY2007, WY2011 and WY2014), and THg concentrations greater than 77 ng/g were typically associated with dry years. Dry conditions and dry out have been found to promote sulfate production and Hg release from sediments, and, consequently, high rates of Hg methylation in the Everglades (Gilmour et al., 2004a; Rumbold and Fink, 2006).

**Table G-7.** Age-standardized (EHg3) and arithmetic mean concentrations of THg in largemouth bass fillets (ng/g wet weight) collected in WY2013 from non-Everglades Construction Project marsh sites. Arithmetic mean, standard deviation, and sample size are shown in parentheses.

| Site | EHg3 ± 95th C.I. (mean ± 1 SD, n) ng/g wet | Between-Year Change (%) (WY2013 to WY2014) | Cumulative EHg3 |
|---|---|---|---|
| LOXF4 | NA (484±288,20) | NA | 420 |
| WCA2F1 | NA | NA | 259 |
| CA2NF | 437±95 (345±137, 20) | NA | 426 |
| HOLYBC | 639±170 (504±220,20) | 11 NA | 602 |
| ROTENC | NA (610±136, 20) | NA | 806 |
| WCA2U3 | 965±95 (592±249,20) | 2 | 807 |
| CA33ALT | NA 537, 1 | NA | 1,311 |
| CA35ALT | NA (948±228,9) | NA | NA |
| CA3F3 | 665±193 (504±219,20) | | 528 |
| CA315 | NA 664±286, 25 | NA | 794 |
| CA3F2 | 1021±209 (467±290,20) | NA | 458 |
| L67F1 | 1809±445 (1125±647,20) | 29 | 1,344 |

$[(WY2014–WY2013)/WY2014]*100

NA – Data not available due to low water or no fish available

Note: Cumulative mean for period of record (POR) (WY1999–WY2014)

± 95% C.I. of mean: n = 2622; 553 ± 16 ng/g; 50th, 75th, and 90th percentiles for POR were 440, 670, and 1040 ng/g, respectively

† Mean includes dropped stations no longer under permit

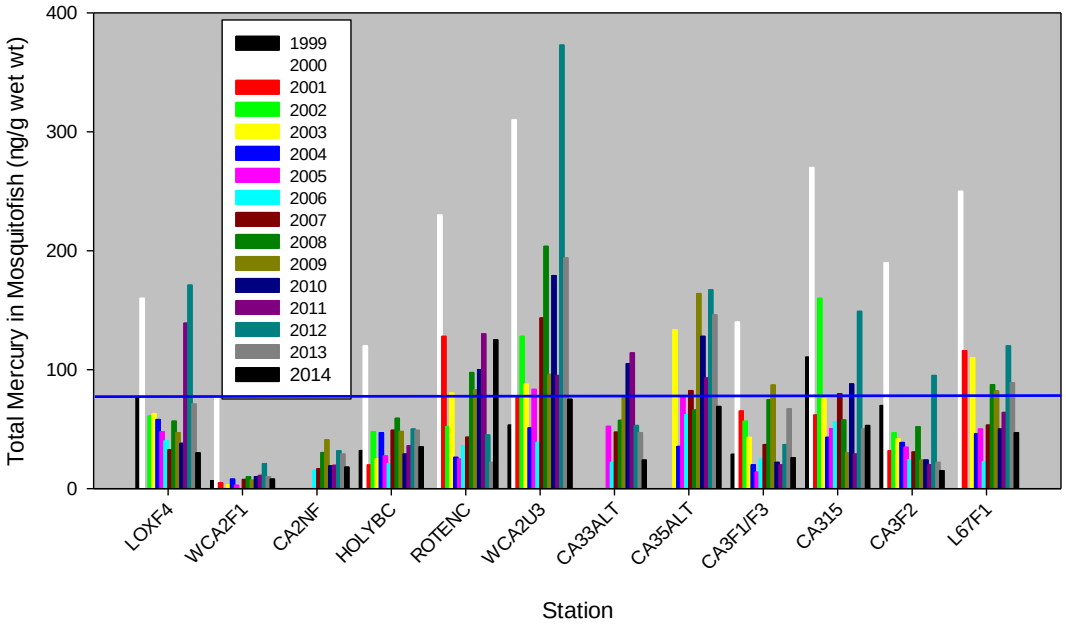



**Figure G-6.** THg concentrations in mosquitofish (ng/g, wet weight) collected at current Non-ECP marsh sites from WY1999–WY2014. The blue line is the USEPA criterion of THg (77 ng/g) for trophic level 3 (TL3) fish. [Note: Site WCA2F1 is the same as L39F1. CA3F1 has been replaced by CA3F3 since WY2011. Not all sites were sampled in all years. TL3 criterion is used as a surrogate for mosquitofish, which is considered to be representative of fish species between TL2 and TL3.]

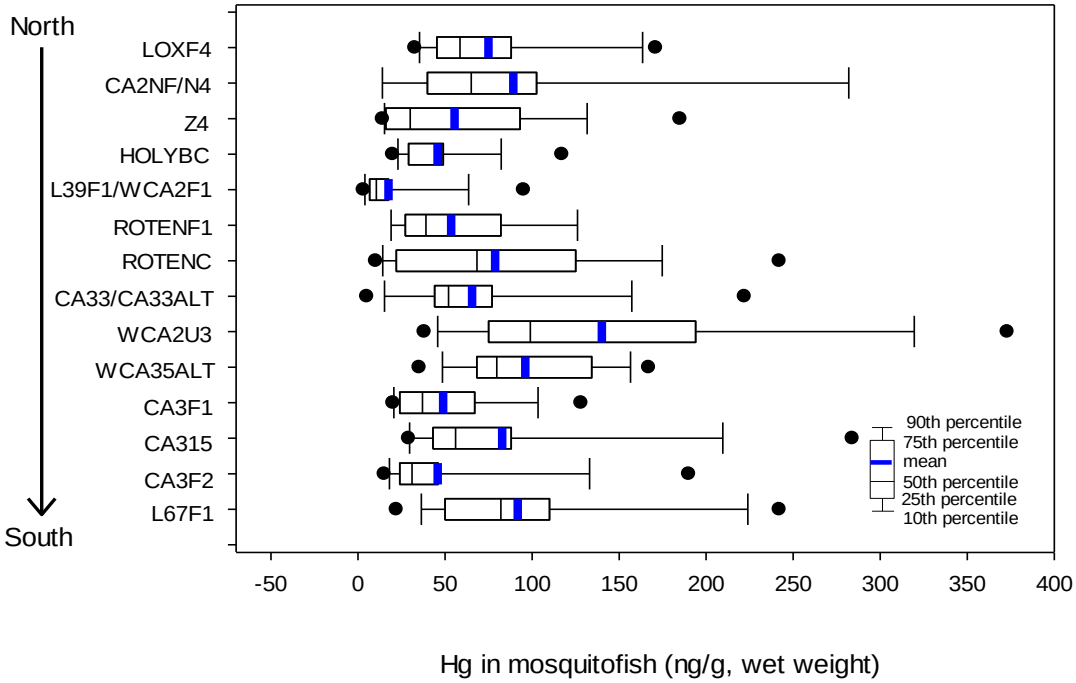



**Figure G-7.** THg concentration (ng/g, wet weight) distributions in mosquitofish collected at Non-ECP marsh sites from WY1999–WY2014. [Note: Not all sites were sampled in all years.]

## Sunfish

Four species of sunfish—bluegill (*Lepomis macrochirus*), redear sunfish (*L. microlophus*), spotted sunfish (*L. punctatus*), and warmouth (*L. gulosus*) —have been sampled for THg analysis from across the EPA, Holey Land Wildlife Management Area, and Rotenberger Wildlife Management Area since WY1999. THg levels in sunfish collected from downstream sites in WY2014 (n = 222) ranged from 87 ng/g from WCA2F1, near the inflow in northern WCA-2, to 395 ng/g from L67F1 (**Table G-6**) in the ENP Shark River Slough, with an average of 201 ng/g. This presents an average increase of 14 percent compared to WY2013. In WY2014, four of the 12 sites showed decreases in THg concentrations in sunfish, with a range from 9% (CA3F3) to 45% (LOXF4). Eight monitoring sites showed increases in sunfish THg concentration, ranging from 17 to 42 percent. This is in contrast with mosquitofish THg levels, which showed significant decreases in the majority of stations with an average decline of 33% in WY2014. The average for WY2014 (201 ng/g) and the long-term cumulative mean (187 ng/g) exceeded the USEPA MeHg criterion (77 ng/g) for trophic level 3 (TL3) fish for wildlife protection. 11 of the 12 monitoring sites exceeded this criterion for WY2014 and the POR. The only exception was at WCA2F1 (13 ng/g for WY2014 and 46 ng/g for POR).

Despite the large fluctuation in sunfish THg levels over time (**Figure G-8**), in general, there are only a few significant trends of changes (either increase or decrease) observed in the monitoring sites. Spearman Rank Correlation analysis identified a significant trend of increases at CA35ALT (r=0.670, p=0.008, n=14 years) and WCA2U3 (r=0.749; p<0.001, n=16 years), and a significant trend of decreases at WCA2F1 (r=-0.749, p=0.001, n=14 years).

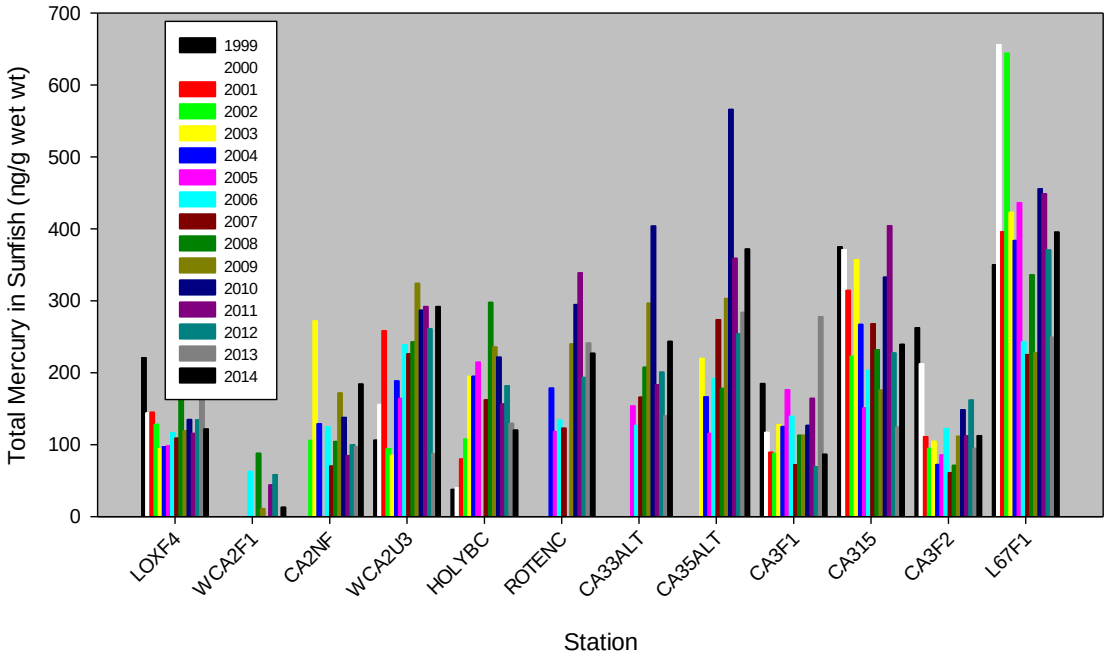



**Figure G-8**. THg concentrations in whole sunfish collected at 12 Non-ECP marsh sites from WY1999–WY2014. [Note: Site WCA2F1 is the same as L39F1. CA3F1 has been replaced by CA3F3 since WY2011.]

In WY2014, sunfish continued to show significant spatial variation in THg levels (**Table G-6)**. One-way ANOVA on Ranks for sites showed significant differences among sites (df = 10; H = 113; p < 0.001). Fish from L67F1 contained the highest median concentration (333 ng/g, n-20), while WCA2F1 showed the lowest THg in sunfish (13 ng/g, n=2). When data

are pooled and analyzed by water impoundment, there is a clear north to south increasing trend in sunfish THg concentrations (see Volume I, Chapter 3B).

As observed over the past several years, in WY2014 fish species were a significant factor in tissue mercury concentrations when data were pooled across sites (Kruskal-Wallis One-Way ANOVA Analysis; df = 3; H = 15.97; p = 0.001). In WY2014, average THg levels were identical for spotted sunfish (0.263 ng/g), followed by warmouth sunfish (258 ng/g), bluegill sunfish (193 ng/g), redear sunfish (121 ng/g). The rank of THg based on data for the POR is also the same (Fig. G-9). The averages THg concentrations in all species pooled across monitoring sites for the POR and WY2014 exceeded the USEPA TL3 fish criterion (77 ng/g) for protection of wildlife.

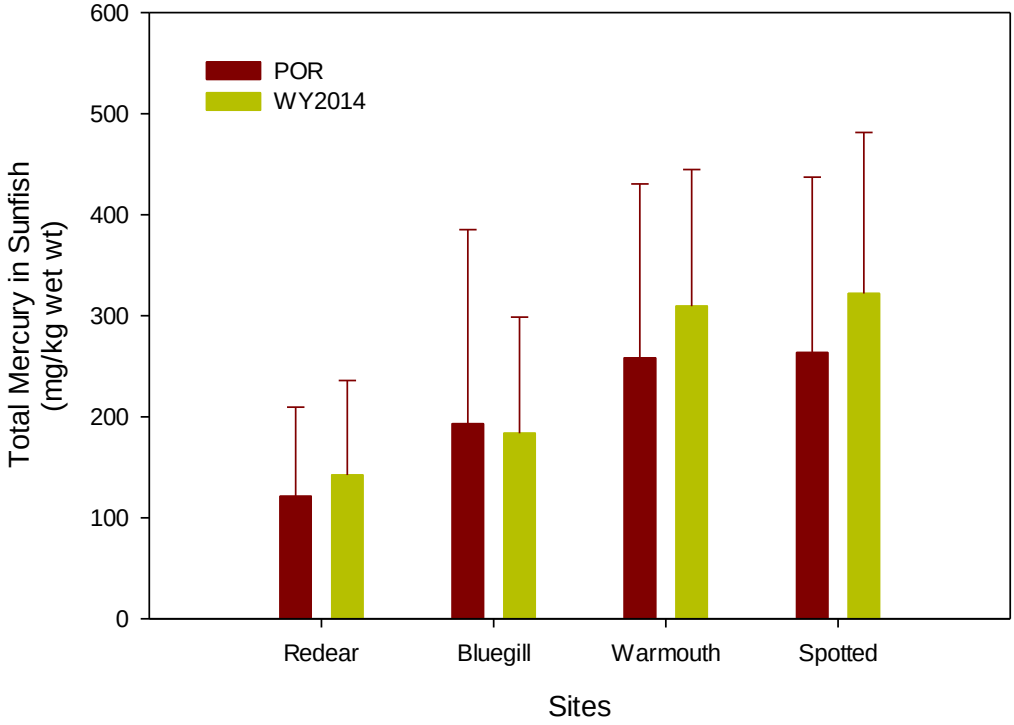



**Figure G-9.** Species-specific THg concentrations in whole sunfish collected at Non-ECP marsh sites for the period of record (POR) and WY2014.

## Largemouth Bass

In WY2014, during October–November 2013, 195 largemouth bass (LMB) (*Micropterus salmoides*) were collected at 11 monitoring sites. This was 24 more than the number collected in WY2013. During WY2013, LMB could not be collected from three of the 12 monitoring sites. The only site where fish were not able to be collected during WY2014 was WCA2F1. For this site fish were also not collected during WY2012 and WY2013. The lowest THg value was 139 ng/g, in a one-year-old LMB collected from WCA2U3. The highest THg value was 2, 710 ng/g in a one-year-old LMB from L67F1. Site-specific, age-standardized concentrations (estimated for a three-year-old bass symbolized as EHg3) ranged from 437 ng/g at CA2NF, to 1,807 ng/g at L67F1 (**Table G-7** and **Figure G-10**). Based on sites where it was appropriate to calculate site-specific EHg3, and with sufficient data, the grand mean value was 923 ng/g in WY2014, while the arithmetic mean THg value for WY2014 was 590 ng/g. With the exception of LOXF4 (THg = 266 ng/g) and CA2NF (THg = 345 ng/g), all other sites with fish collected displayed an average THg level above the USEPA Trophic Level 4 (TL4) fish MeHg criterion

(346 ng/g) for wildlife protection. The average EHg3 level, based on available data, was two times greater than the USEPA TL4 fish criterion for wildlife protection.

Similar to previous years, in WY2014 LMB exhibited spatial patterns in tissue Hg concentrations (**Table G-6**; **Figure G-10**). The northernmost sites (LOXF4) had the lowest LMB THg concentration while the southernmost site (L67F1) had the highest. There was a slight increase in EHg3 in WY2014. However, the ENP monitoring site (L6F1) displayed a 29% increase in EHg3 and a 15% increase in arithmetic average compared to WY2013. The high EHg3 concentrations were consistently observed in L67F1, exceeding 1,000 ng/g for all years except 2008. However, mosquitofish and sunfish THg concentrations at this site were not the highest among sites in WY2014 (**Figure G-11**). For the POR, both sunfish and LMB THg levels were highest at L67F1, but the mosquitofish THg level was highest at WCA2U3 (**Figure G-11**). Further data analysis using environmental information such as sulfate concentration, hydrology, and trophic ecology may help explain the mercury hotspots in the EPA.

For most monitoring sites, there were no increasing trends in THg concentration, which fluctuated during the monitoring period (**Figure G-10**) with one exception. LMB THg concentrations displayed a significant increasing trend at CA35ALT (r=0.670, p = 0.008, n=14 years). THg concentrations at L67F1 fluctuated between 616 ng/g and 1444 ng/g during the last 10 years. LMB THg decreased in WY2012 and WY2013, but increased in WY2014 over WY2013 (**Figure G-10**).

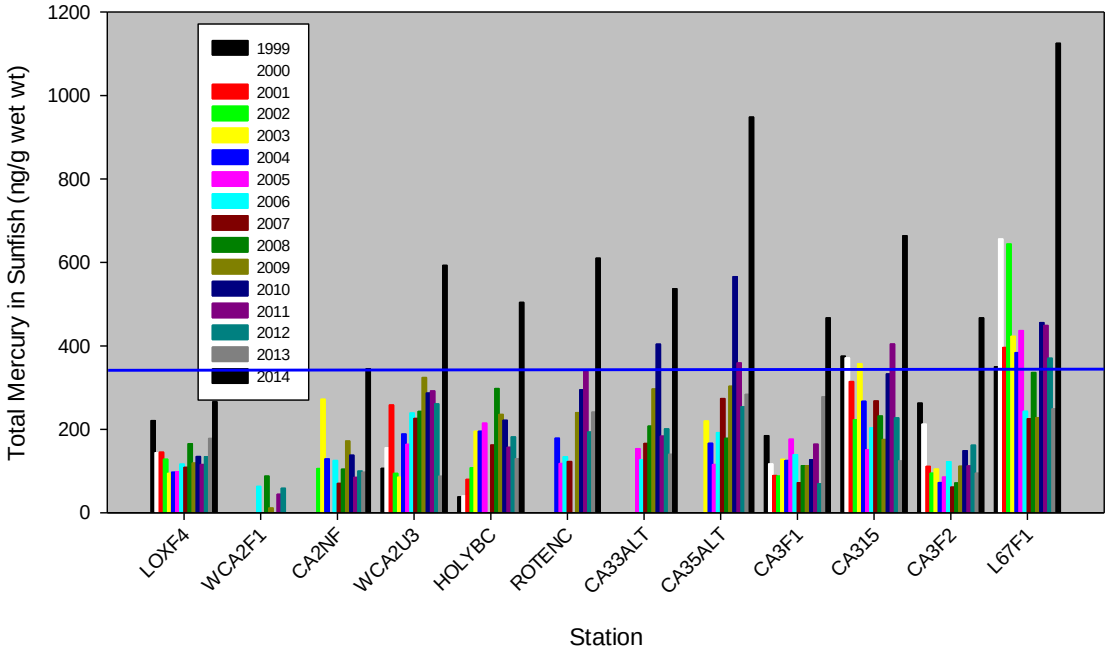



**Figure G-10.** THg concentrations in largemouth bass collected at downstream sites from WY1999–WY2014. [Note: Site WCA2F1 is the same as L39F1. CA3F1 has been replaced by CA3F3 since WY2011.]

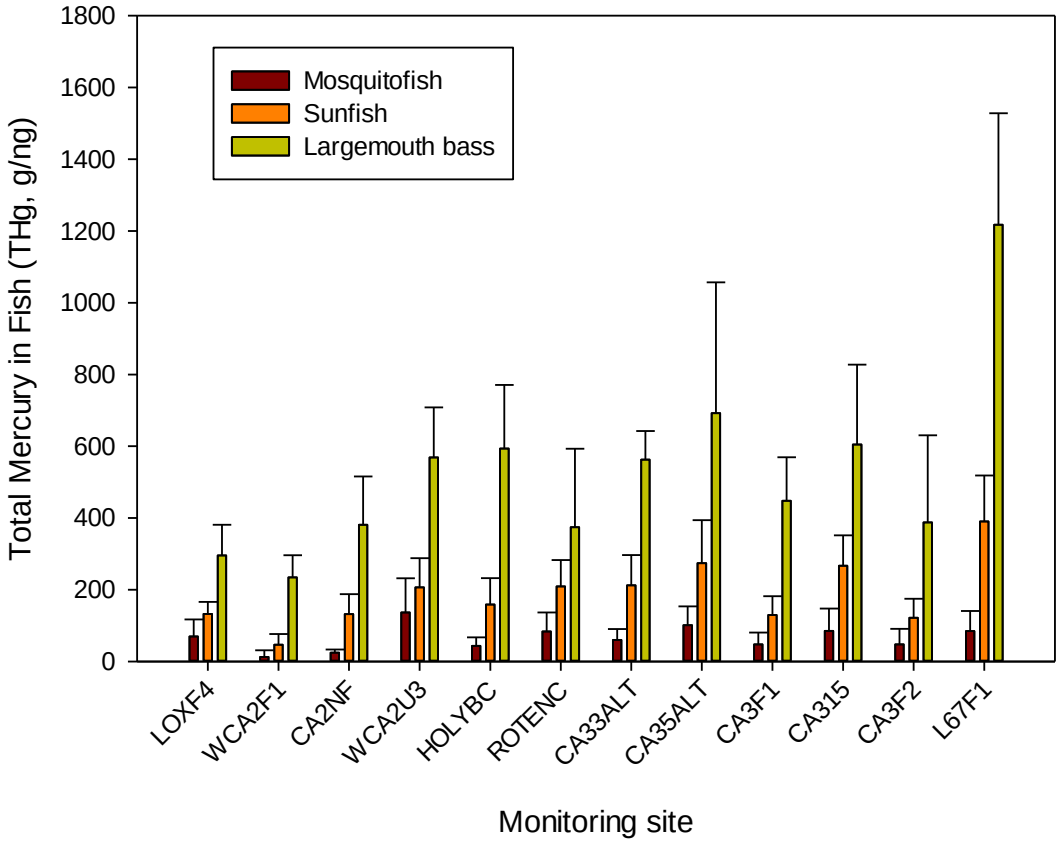



**Figure G-11.** THg concentrations in mosquitofish, sunfish and largemouth bass collected at downstream sites from WY1999–WY2014. [Note: Site WCA2F1 is the same as L39F1. CA3F1 has been replaced by CA3F3 since WY2011.]

Low THg concentrations (i.e., less than 0.077 mg/kg) in mosquitofish were found in wet years (WY2000, WY2002–WY2007, WY2011 and WY2014), and THg concentrations greater than 0.077 mg/kg were typically observed in dry years. Dry conditions and dryout have been found to promote sulfate production and Hg release from sediments and, consequently, high rates of Hg methylation in the Everglades (Gilmour et al., 2004a; Rumbold and Fink, 2006). However, both sunfish and LMB THg concentrations were higher in WY2014 than in WY2013. The higher THg concentrations in LMB may be attributed to similar increases in the THg burden in sunfish, which is a major part of the diet of LMB. The disparity between mosquitofish and sunfish THg needs further study.

## PREDATOR PROTECTION CRITERIA

Mercury levels in fish tissues can also be evaluated and put into perspective regarding mercury risk to wildlife. The U.S. Fish and Wildlife Service (USFWS) has proposed a predator protection criterion of 100 ng/g of THg in prey species (Eisler, 1987). The USEPA has proposed criteria of 77 ng/g and 346 ng/g for TL3 and TL4 fish, respectively, for the protection of fish-eating avian and mammalian wildlife (USEPA, 1997).

In WY2014, only 8 percent, or one site, of all mosquitofish/sites [considered to be tropic levels 2 and 3 (TL2 and TL3, respectively), depending on age; Loftus et al., 1998] exceeded the USEPA criterion of 77 ng/g[1]. This exceedance occurred at ROTENBC. In WY2013, three sites (WCA2U3, CA35ALT and L67F1) had mosquitofish THg exceeding USEPA criterion. In WY2014, 82 percent of all sunfish, which are TL3, exceeded the USEPA criterion of 77 ng/g (**Table G-6)**. The percent exceedances are similar to WY2013. As discussed in previous reports, these findings are significant because sunfish and mosquitofish represent the preferred prey item of many fish-eating species in the Everglades.

Based on the equation developed for whole-body weighted THg concentration (whole body THg = 0.695 x fillet THg (Lange et al., 1998), 50 percent of all LMB exceeded the TL4 criteria in WY2014, which is a 6% increase compared to WY2013. Exceedances in WY2014 were primarily at station CA315 (90%), followed by L67F1 (85%), ROTENC (75%), WCA2U3 (65%), HOLYBC (50%), and CA35ALT (45%). In WY2014, 5 percent of fish samples exceeded the USEPA human health criterion of 850 ng/g, which is a limited consumption criterion for women of child-bearing age and young children. These samples came from stations L67F1 (7 fish), HOLYBC and CA315, CA35ALT and CA3F2 (1 fish each). One fish sample collected at L67F1 exceeded the FDOH human health no consumption advisory of 1,500 ng/g in WY2014. Further information on Florida fish consumption advisories is available on the FDOH website at www.doh.state.fl.us/floridafishadvice. Based on WY2014 findings, certain Everglades populations of fish-eating avian and mammalian wildlife continue to be at potential risk for adverse effects from mercury exposure depending on where they forage.

## WADING BIRD FEATHERS FROM WATER CONSERVATION AREA 3A

In WY2014, collection of wading bird feathers by District field staff was unsuccessful due to time constraints specified in the FWC scientific collecting permit. Therefore, no mercury data for wading bird feathers are available for this reporting period.

Great egret feather mercury concentration data collected within Water Conservation Area 3A from previous years have been published in previous years' reports (Gu and Nicole 2012).

[1] TL3 criterion is used as a surrogate for mosquitofish, which is considered to be representative of fish species between TL2 and TL3.

# OPTIMIZING THE MONITORING NETWORK

Non-ECP mercury monitoring networks are routinely reviewed to streamline costs, improve scientific findings, and to adhere to compliance monitoring requirements. Specific changes to Non-ECP monitoring during the reporting period are summarized below. Updates on permit compliance monitoring for mercury in the STAs are included in Appendix 3-1 of this volume.

## DOWNSTREAM FISH MONITORING (PROGRAM HGFS):

- No changes or modifications in WY2014.

## DOWNSTREAM GREAT EGRET FEATHER MONITORING (PROGRAM HGBM):

- No changes or modifications in CY2013.

## MERCURY DEPOSITION NETWORK (MDN) MONITORING:

- No changes or modifications in CY2013.

# LITERATURE CITED

Abtew and Ciuca. 2014. Chapter 2: South Florida Hydrology and Water Management. In: *2014 Everglades Consolidated Report*, South Florida Water Management District, West Palm Beach, FL.

Atkeson, T. and P. Parks. 2002. Chapter 2B: Mercury Monitoring, Research and Environmental Assessment. In: *2002 Everglades Consolidated Report*, South Florida Water Management District, West Palm Beach, FL.

Bates, A.E., W.H. Orem, J.W. Harvey and E.C. Spiker. 2002. Tracing Sources of Sulfur in the Florida Everglades. *Journal of Environmental Quality*, 31: 287-299.

Bloom, N.S. 1992. On the Chemical Form of Mercury in Edible Fish and Marine Invertebrates. *Can. J. Fish. Aquat. Sci.*, 49: 1010-1017.

Cabral, J.A. and J.C. Marques. 1999. Life History, Population Dynamics and Production of Eastern Mosquitofish, *Gambusia holbrooki* (Pisces, Poeciliidae), in Rice Fields of the Lower Mondego River Valley, Western Portugal. *Acta Oecologica*, 20: 607-620.

Eisler, R. 1987. Mercury Hazards to Fish, Wildlife and Invertebrates: A Synoptic Review. *U.S. Fish Wildl. Serv. Biol. Rep*., 85 (1.10).

FDEP. 2003. Integrating Atmospheric Mercury Deposition with Aquatic Cycling in South Florida: An Approach for Conducting a Total Maximum Daily Load Analysis for an Atmospherically Derived Pollutant. Florida Department of Environmental Protection, Tallahassee, FL.

Fink, L.E., D.G. Rumbold and P. Rawlik. 1999. Chapter 7: The Everglades Mercury Problem. G. Redfield, ed. In: *1999 Everglades Interim Report*, South Florida Water Management District, West Palm Beach, FL.

Frederick, P.C., M.G. Spalding, M.S. Sepulveda, G.E. Williams, Jr., S.M. Lorazel and D.A. Samuelson. 1997. Effects of Elevated Mercury on Reproductive Success of Long-Legged Wading Birds in the Everglades. Final Report. Prepared by the University of Florida for the Florida Department of Environmental Protection, Tallahassee, FL.

FTN Associates. 1999. Everglades Mercury Baseline Report for the Everglades Construction Project under Permit No. 199404532. Prepared for the South Florida Water Management District, West Palm Beach, FL.

Gabriel, M., N. Howard, F. Matson, S. Atkins and D. Rumbold. 2007. Appendix 3B-1: Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area. In: *2008 South Florida Environmental Report – Volume I*, South Florida Water Management District, West Palm Beach, FL.

Gilbert, R.O. 1987. *Statistical Methods for Environmental Pollution Monitoring*. Van Nostrand Reinhold, New York, NY.

Gilmour, C.C., E.A. Henry and R. Mitchell. 1992. Sulfate Stimulation of Mercury Methylation in Freshwater Sediments. *Environmental Science and Technology*, 26: 2281-2287.

Gilmour, C.C., G.S. Riedel, M.C. Ederington, J.T. Bell, J.M. Benoit, G.A. Gill and M.C. Stordal. 1998. Methylmercury Concentrations and Production Rates Across a Trophic Gradient in the Northern Everglades. *Biogeochemistry*, 40: 327-345.

Gilmour, C.C. and D.P. Krabbenhoft. 2001. Appendix 7-4: Status of Methylmercury Production Studies. G. Redfield, ed. In: *2001 Everglades Consolidated Report*, South Florida Water Management District, West Palm Beach, FL.

Grieb, T.M., C.T. Driscoll, S.P. Gloss, C.L. Schofield, G.L. Bowie and D.B. Porcella. 1990. Factors Affecting Mercury Accumulation in Fish in the Upper Michigan Peninsula. *Environ. Toxicol. Chem.,* 9: 919-930.

Gu, B. and N. Howard. 2014. Appendix 3-2, Attachment F: Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area. In: *2012 South Florida Environmental Report – Volume III*, South Florida Water Management District, West Palm Beach, FL.

Guentzel, J. 1997. The Atmospheric Sources, Transport and Deposition of Mercury in Florida. Ph.D. Thesis. Florida State University, Tallahassee, FL.

Haake, P.W. and J.M. Dean. 1983. Age and Growth of Four Everglades Fishes Using Otolith Techniques. Report to the National Park Service, Everglades National Park, Homestead, FL. May, 1983.

Hakanson, L. 1980. The Quantification Impact of pH, Bioproduction and Hg-Contamination on the Hg Content of Fish (Pike). *Environ. Pollut., (Series B),* 1: 285-304.

Haynes, J. and C. Cashner. 1995. Life History and Population Dynamics of the Western Mosquitofish: A Comparison of Natural and Introduced Populations. *J. Fish Biol.,* 46: 1026-1041.

Jeremiason, J.D., D.R. Engstrom, E.B. Swain, E.A. Nater, B.M. Johnson, J.E. Almendinger, B.A. Monson and R.K. Kolka. 2006. Sulfate Addition Increases Methylmercury Production in an Experimental Wetland. *Environmental Science and Technology*, 40: 3800-3806.

Lai, S., T.M. Holsen, P.K. Hopke and P. Liu. 2007. Wet Deposition of Mercury at a New York State Rural Site: Concentrations, Fluxes, and Source. *Atmospheric Environment*. 41: 4337-4348.

Lange, T.R., D.A. Richard and H.E. Royals. 1998. Trophic Relationships of Mercury Bioaccumulation in Fish from the Florida Everglades. Annual Report. Florida Game and Fresh Water Fish Commission, Fisheries Research Laboratory, Eustis, FL. Prepared for the Florida Department of Environmental Protection, Tallahassee, FL.

Lange, T.R., D.A. Richard and H.E. Royals. 1999. Trophic Relationships of Mercury Bioaccumulation in Fish from the Florida Everglades. Annual Report. Florida Game and Fresh Water Fish Commission, Fisheries Research Laboratory, Eustis, FL. Prepared for the Florida Department of Environmental Protection, Tallahassee, FL.

Loftus, W.F., J.C. Trexler and R.D. Jones. 1998. Mercury Transfer through the Everglades Aquatic Food Web. Final Report submitted to the Florida Department of Environmental Protection, Tallahassee, FL.

Marsik, F.J., G.J. Keeler and M.S. Landis. 2007. The Dry-Deposition of Speciated Mercury to the Florida Everglades: Measurements and Modeling. *Atmospheric Environment*, 41: 136-149.

Mercury Technical Committee. 1991. Interim Report to the Florida Governor's Mercury in Fish and Wildlife Task Force and Florida Department of Environmental Regulation. Center for Biomedical and Toxicological Research, Florida State University, Tallahassee, FL. 60 pp.

Nilles, M. 2004. The Mercury Deposition Network (MDN) – National Status and Trends. Presented at the U.S. Geological Survey 2004 Mercury Workshop (August 17–18, 2004) Reston, VA.

Renner, R. 2001. Everglades Mercury Debate. *Environ. Science and Technology*, 35: 59A–60A.

Rumbold, D.G. 2005. Appendix 2B-1: Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area. G. Redfield, ed. In: *2005 South Florida Environmental Report – Volume I*, South Florida Water Management District, West Palm Beach, FL.

Rumbold, D., N. Niemeyer, F. Matson, S. Atkins, J. Jean-Jacques, K. Nicholas, C. Owens, K. Strayer and B. Warner. 2006. Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area. Appendix 2B-1 In: *2006 South Florida Environmental Report – Volume 1*, South Florida Water Management District, West Palm Beach, FL.

Selin, N.E. and D.J. Jacob. 2008. Seasonal and Spatial Patterns of Mercury Wet Depostion in the United States: Constraints on the Contribtuion for North American Anthropogenic Sources. *Atmopsheric Environment*, 42: 5193-5204.

Sepulveda, M., P.C. Frederick, M.S. Spalding and G.E. Williams Jr. 1999. Mercury Contamination in Free-Ranging Great Egret Nestlings (*Ardea albus*) from Southern Florida, U.S.A. *Environ. Tox. Chem.*, 18: 985-992.

USEPA. 1993. Statistical Methods for the Analysis of Lake Water Quality Trends. EPA-841-R-93-003. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

USEPA. 1997. Mercury Study Report to Congress. Volume VI: An Ecological Assessment for Anthropogenic Mercury Emissions in the United States. EPA-452/R-97-008. U.S. Environmental Protection Agency, Washington, D.C.

Ware, F.J., H. Royals and T. Lange. 1990. Mercury Contamination in Florida Largemouth Bass. *Proc. Annual Conference of the Southeast Assoc. of Fish Wildlife Agencies*, 44: 5-12.

Wren, C.D. and H.R. MacCrimmon. 1986. Comparative Bioaccumulation of Mercury in Two Adjacent Freshwater Ecosystems. *Water Research*, 20: 763-769.

Zar, J.H. 1996. *Biostatistical Analysis* (3rd edition). Prentice-Hall, Upper Saddle River, NJ.

# Attachment H: Statements of Authenticity for Analytical and Sampling Programs

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

**STATEMENT OF AUTHENTICITY OF ANALYTICAL PROGRAM**

**DATE:** August 15, 2014

**PROJECT:** Non-ECP

**PERMIT:** FDEP Permit No. 06,502590709 (Non-ECP Permit)

**SUBJECT:** **Specific Permit Condition 12(e)**

The implementation of the analytical program is in compliance with the procedures for authenticity, precision, detection limits, and accuracy as described in the South Florida Water Management District's Quality Assurance Manual in accordance with the requirements under 62-160 F.A.C. and the National Environmental Laboratory Accreditation Program (NELAP).

8/14/14

David M. Struve
Director, Analytical Services Division
Restoration Sciences Department

Date

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Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

**STATEMENT OF AUTHENTICITY OF SAMPLING PROGRAM**

**DATE:** August 11, 2014

**PROJECT:** Non-ECP

**PERMIT:** FDEP Permit No. 06,502590709 (Non-ECP Permit)

**SUBJECT:** **Permit Specific Condition 12(e)**
**Reporting Period – May 1, 2013 through April 30, 2014**

The implementation of the sampling program is in compliance with the procedures for authenticity, precision, detection limits, and accuracy as described in the South Florida Water Management District's Quality Assurance Manual in accordance with the requirements under 62-160 F.A.C.

Signature Date

8/11/14

Linda Crean
Section Administrator, Water Quality Monitoring
Water Quality Bureau

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